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The NATIONAL GEOGRAPHIC MAGAZINE

JUNE, 1925

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ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

THE Society also is maintaining expeditions in the unknown area adjacent to the San Juan River in southeastern Utah, and in Yunnan, Kweichow, and Kansu, China—all regions virgin to scientific study.

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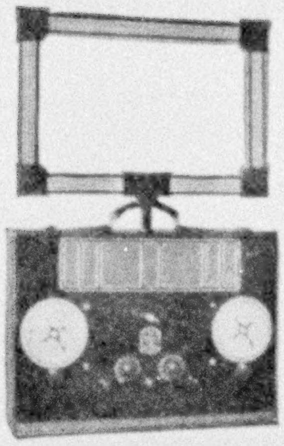

Radiola 24, when closed up for carrying, is a smart suitcase of genuine black cowhide in cobra grain. It has a built-in loudspeaker and with the batteries inside, it weighs about 38 pounds. With six Radiotrons UV-199—entirely complete except batteries, $195

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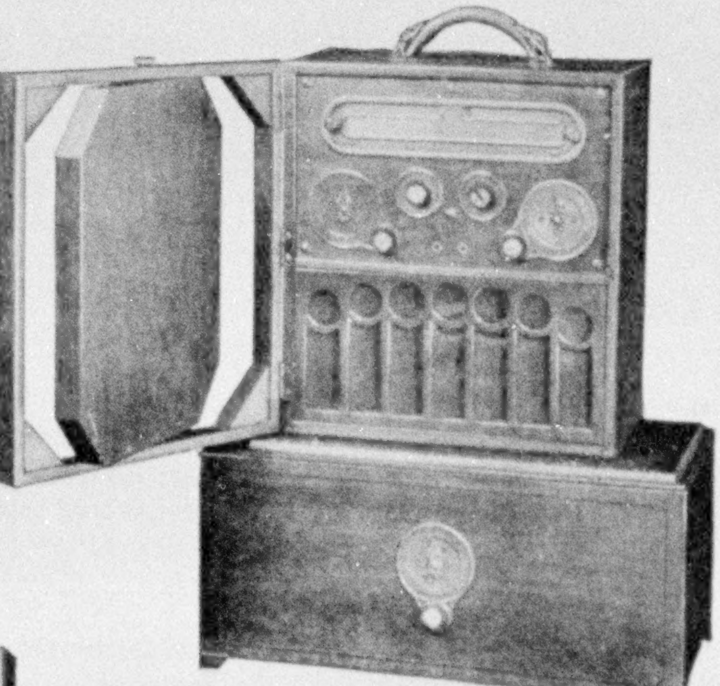

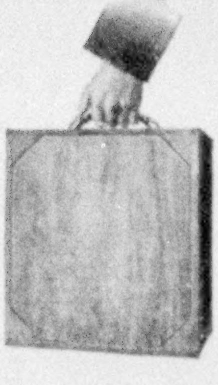

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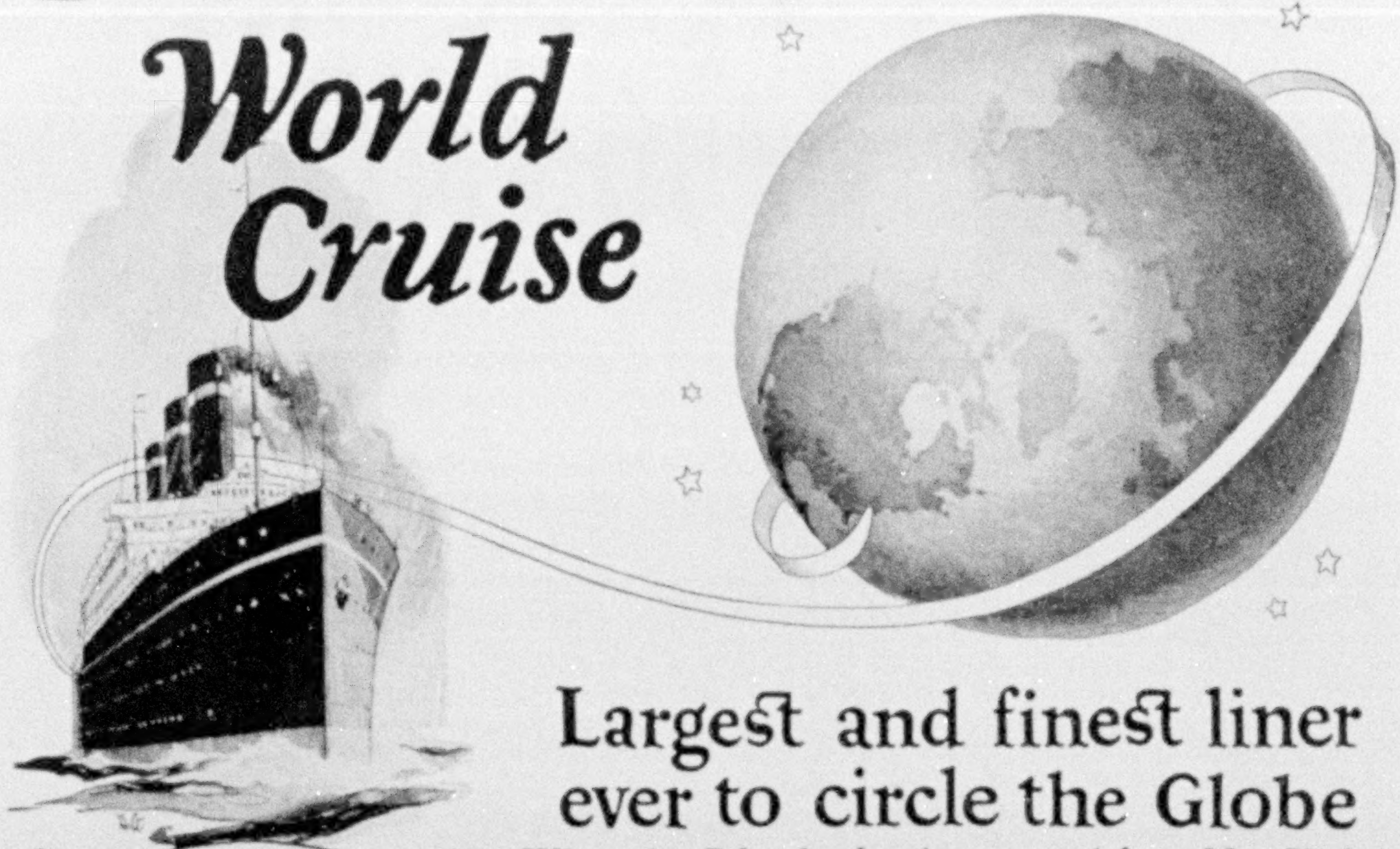

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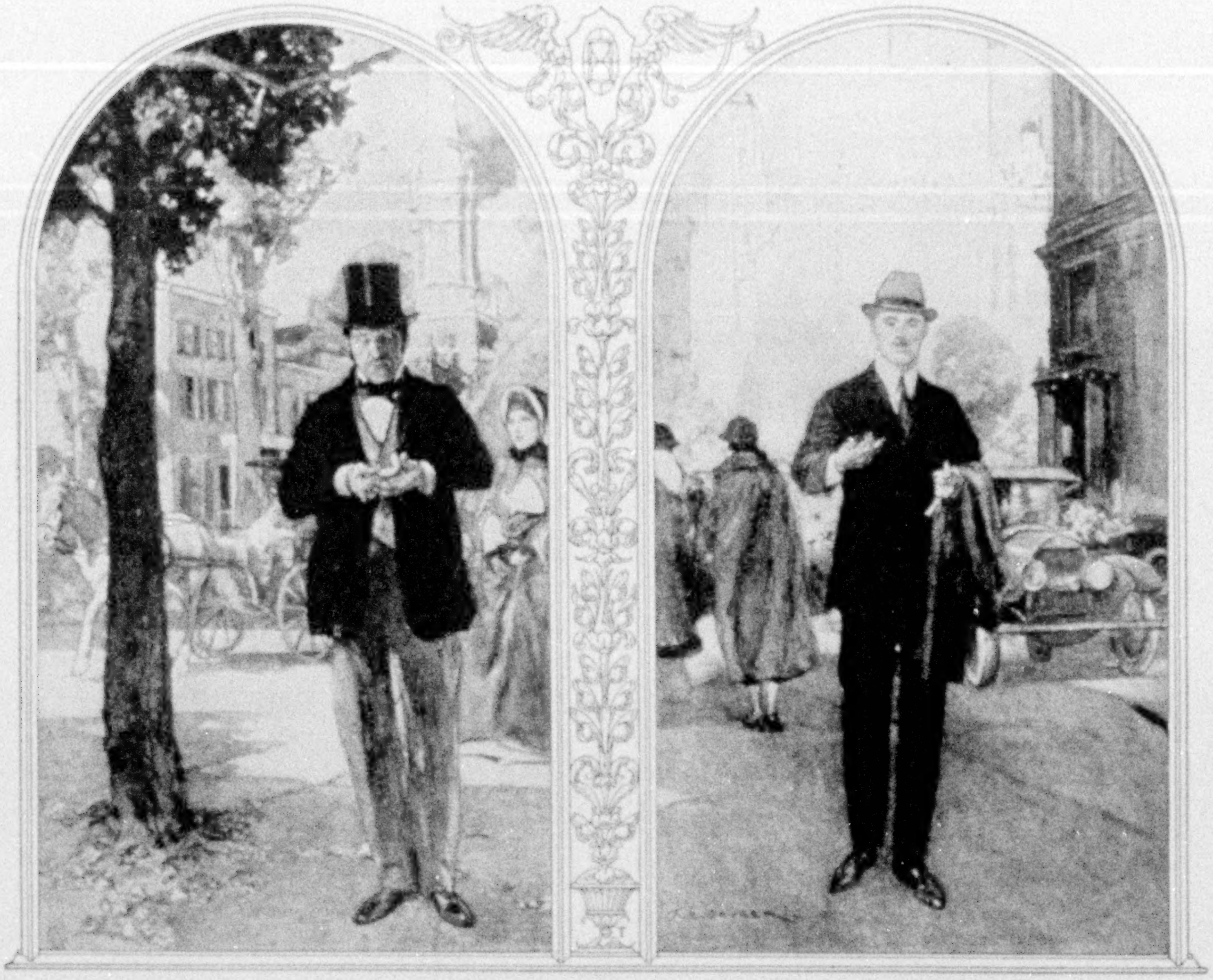

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DOES THE WATCH DATE THE FASHION OF THE MAN?

Beau Brummel maintained that a man's style is rated by the details of his dress.

Thus, his *time-piece* is as important as his *tailoring* in establishing his claim to correct taste. An old fashioned watch suggests an old fashioned wearer—lagging behind the thought and method of his time.

But still more important, a cumbersome design very often means lumbersome service. For in watches, as in motor cars, efficiency often increases as ugliness goes.

That is why Elgin, for sixty years the world's standard in watch accuracy, is equally the world's most beautiful watch. In its greater beauty lies greater utility. An ultra accoutrement of fashion, it is equally the sturdiest, truest and most dependable of all time-keeping instruments.

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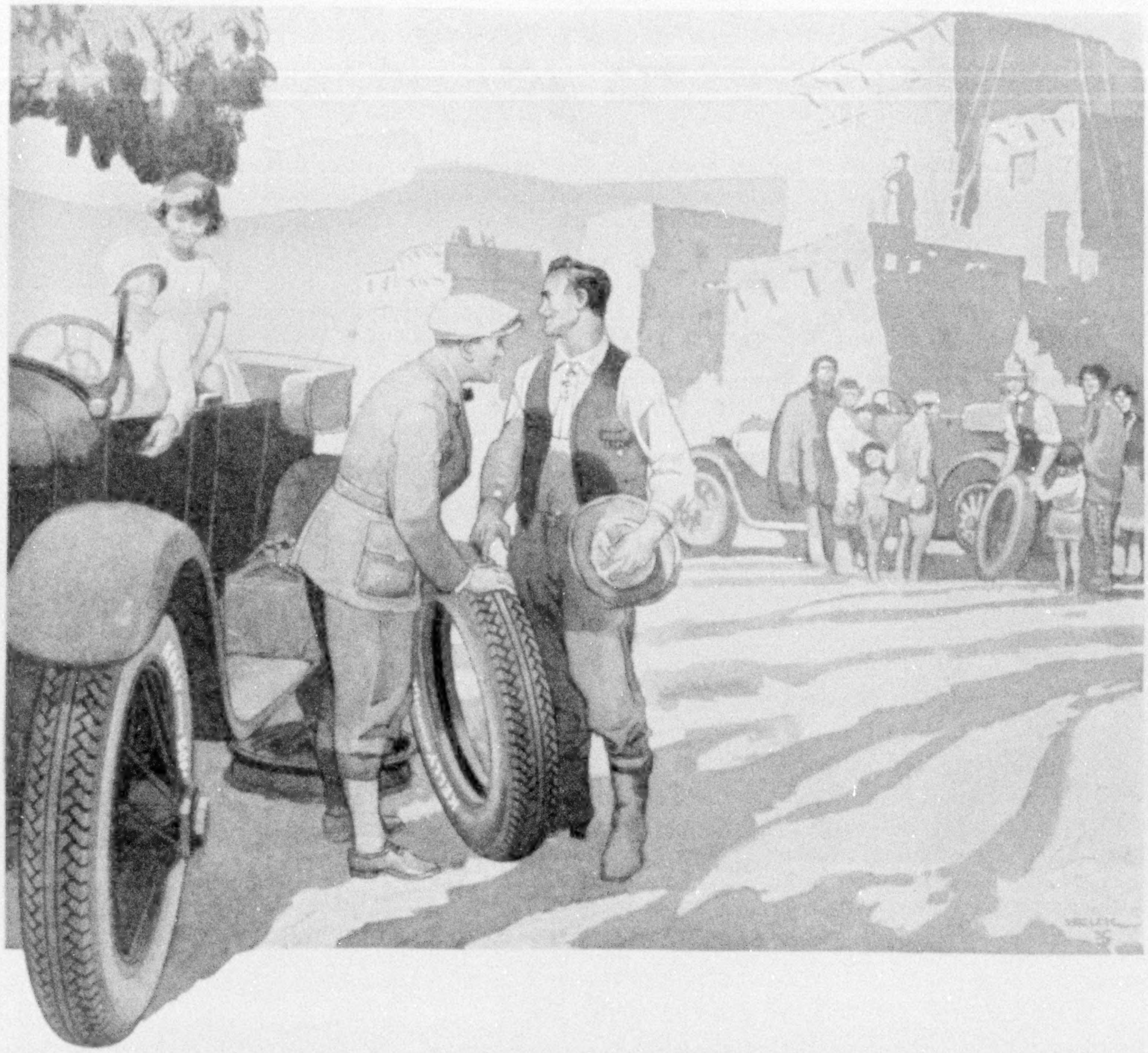
The KELLY FLEXIBLE CORD



The Peregrinations of the Pecks

At one of the New Mexican pueblos Jim finds an opportunity to play good Samaritan. With the common sense characteristic of a man who carries fire, life and accident insurance, he started out on the trip with two spares. As there seems, however, to be small chance that he will need either, he gladly lends one to a fellow motorist who has spent an hour in the broiling Southwestern sun trying to repair a blown-out shoe, and who has just discovered that, fortunately, his rims are the same size as the Pecks'. It looks as though Jim were making another Kelly customer.

THE construction of the Kelly Flexible Cord is different from that of any other tire on the market. It is this difference—the building of the bead as an integral part of the tire instead of as a separate unit fastened in—that for the first time makes possible a tire that is *both* rugged *and* flexible. The ruggedness means mileage. The flexibility means easy riding. That is why the Flexible Cord is by far the best tire Kelly has ever built.

KELLY-SPRINGFIELD TIRES

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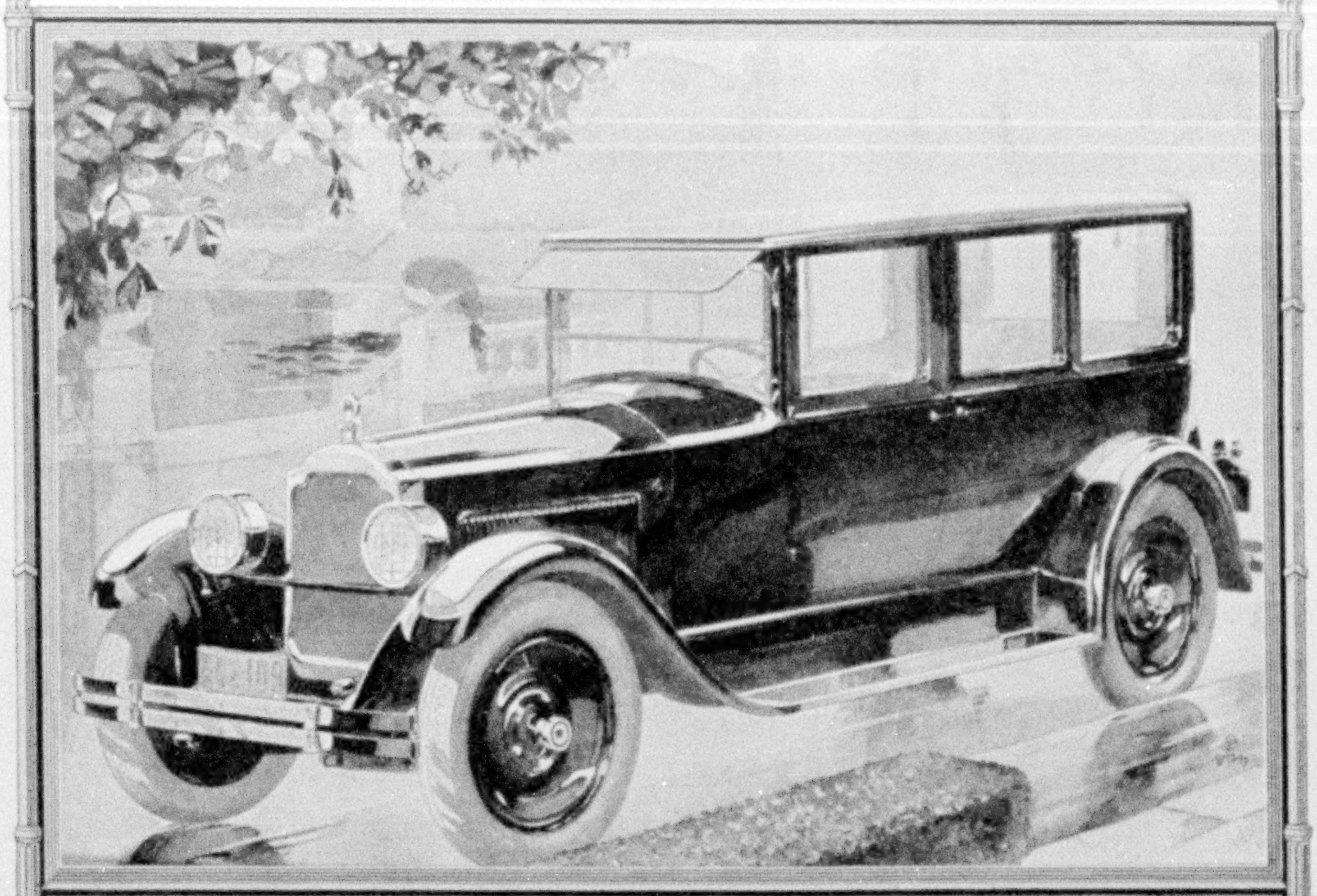

THE PACKARD SIX SEVEN-PASSENGER SEDAN LIMOUSINE IS ILLUSTRATED—[illegible] AT DETROIT

PRECISION IS PROTECTED

In Packard cars precision is fully protected throughout the life of the car.

However finely built no car can remain precision-built in the hands of the average owner unless it is lubricated regularly and completely.

And, so long as motor car lubrication entails drudgery or the giving up of the car at inconvenient times, cars will not be lubricated.

Which means, precision destroyed and then, the opening of pocketbooks.

There is no drudgery or uncertainty in the lubrication of Packard cars.

In the chassis—the pull of a plunger, a second of time, and oil is on the way to the 45 points requiring regular attention.

In the motor—the oil rectifier, automatic in action, insures that every drop of oil remains pure oil.

The result—long life of parts, quietness of operation, and peace of mind for the owner.

Packard Six and Packard Eight both are furnished in ten body types, four open and six enclosed. A liberal monthly payment plan makes possible the immediate enjoyment of a Packard, purchasing out of income instead of capital.

PACKARD

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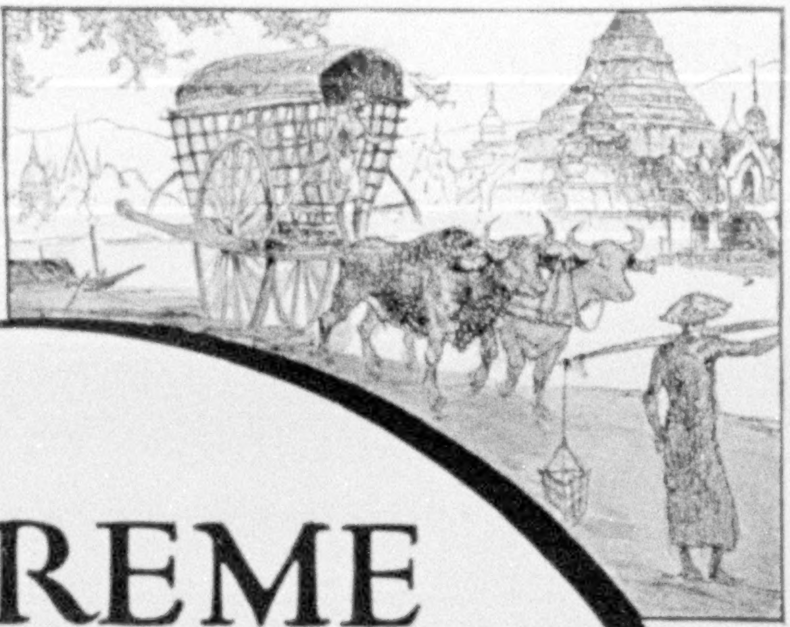

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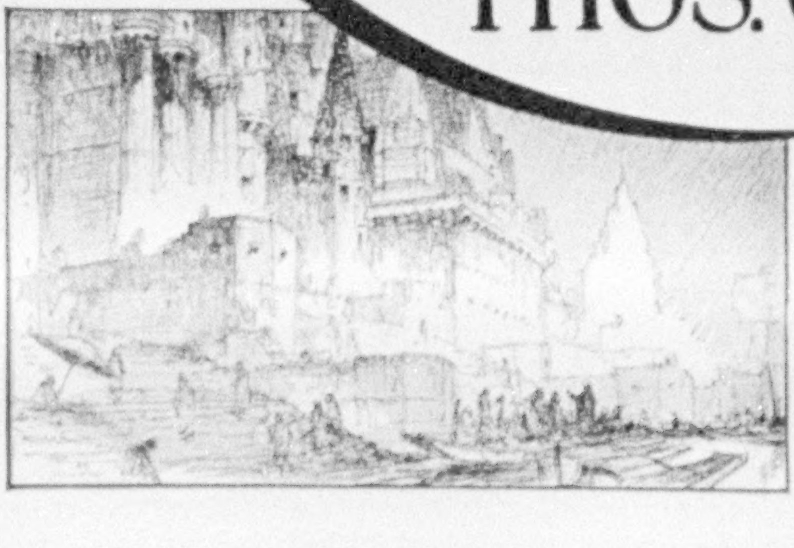
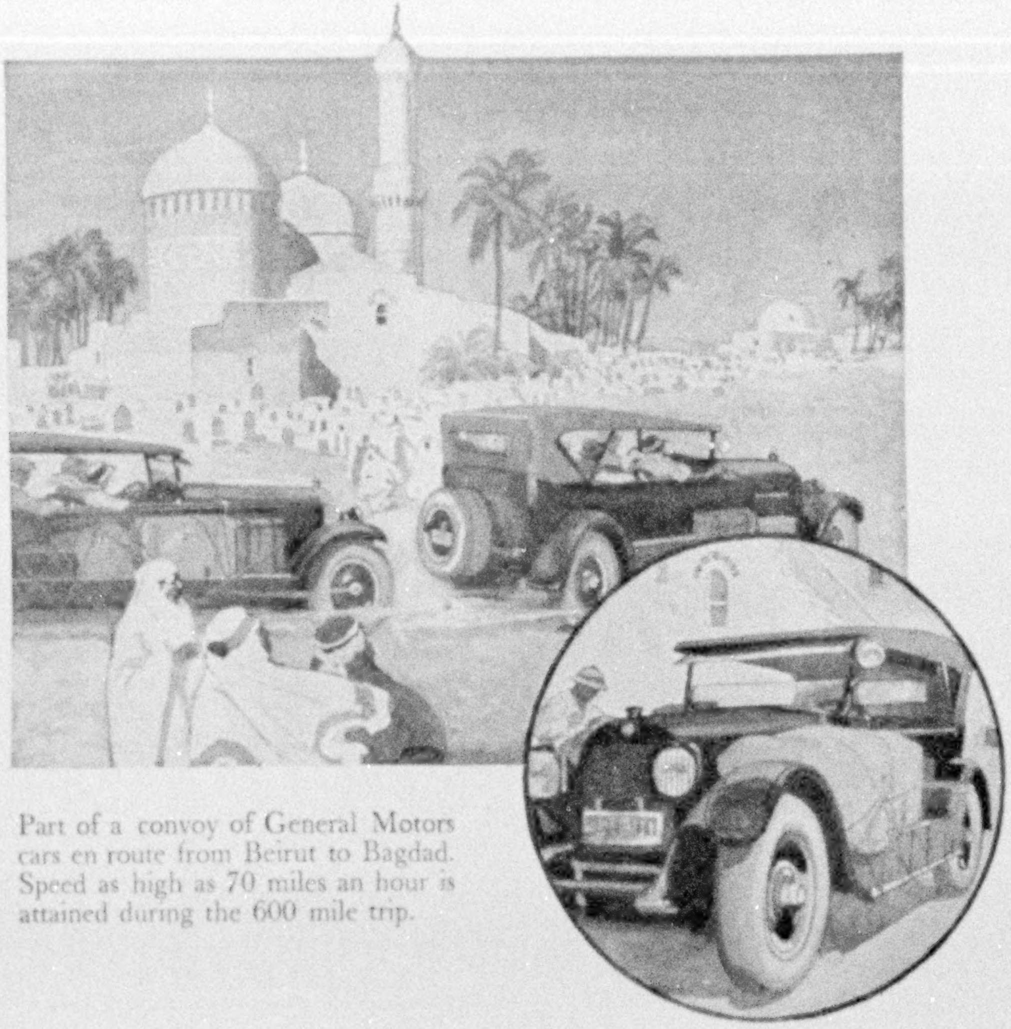


FACTS ABOUT A FAMOUS FAMILY



Part of a convoy of General Motors cars en route from Beirut to Bagdad. Speed as high as 70 miles an hour is attained during the 600 mile trip.

Beirut to Bagdad

It used to take about four weeks to travel from London to Bagdad. To-day, through the service of General Motors cars, you can make the trip in *eight days.*

Across the Syrian Desert—between Beirut on the Mediterranean and Bagdad in Persia—convoys of Buicks and Cadillacs are carrying passengers and mails on a regular schedule. Though heavily laden, they cover 600 miles of sandy waste in less than 24 hours of running—most of the trip at racing speed.

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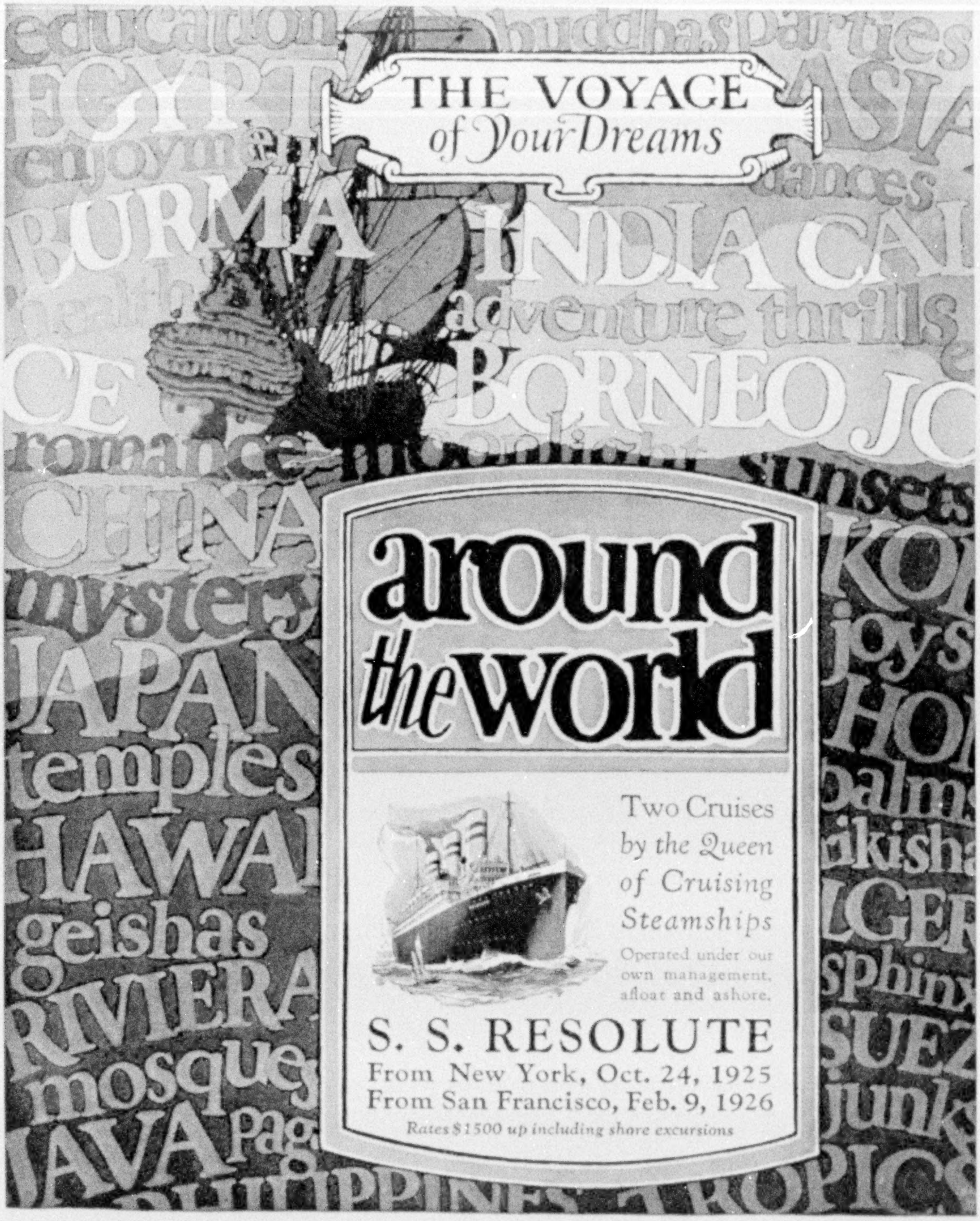
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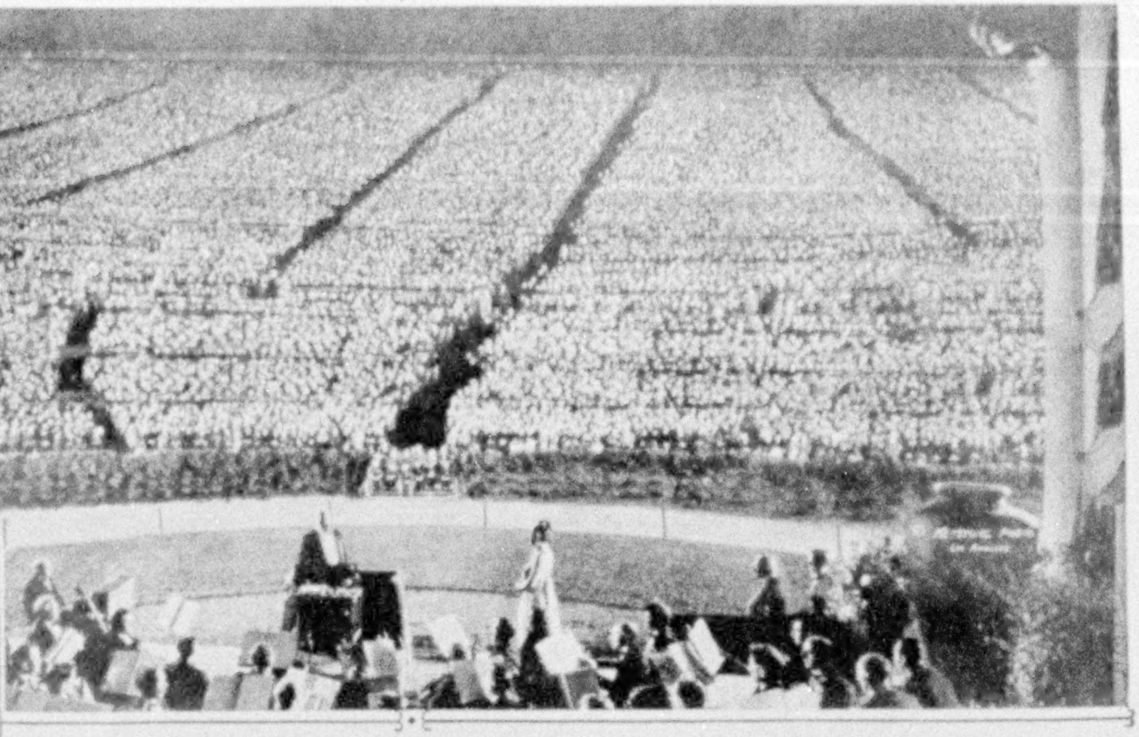

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You, among them, with neighbors on every side, feel that joyful sense of solitude which gorgeous Nature alone can bring.

The heavens, studded with stars, form a soft, welcome canopy. On every hand are uneven horizons where the hills, painted in night's quiet colors, meet the sky.

A faint fragrant breeze stirs lazily about.

Then as though from the distance of the stars comes a lilting melody. With closed eyes you listen, spirit perfectly attuned, seeing the lovely pictures which the music paints for you.

And Other Nights

Such is a night in the Hollywood Bowl, where circling hills echo back the harmonies of a symphony orchestra.

It's not remarkable that the night is cool. For all nights in Southern California are cool. And the days are just right for outdoor recreation.

The U.S. Weather Bureau's figures for forty-seven years—average mean temperatures taken in a central (inland) city in this section—show 47 Junes, 66 degrees; 47 Julys, 70; 47 Augusts, 71; 47 Septembers, 69.

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You hike, fish, sail, ride, motor over smooth boulevards, lined with new beauties and strange sights. You swim in the surf or loll on a sandy beach.

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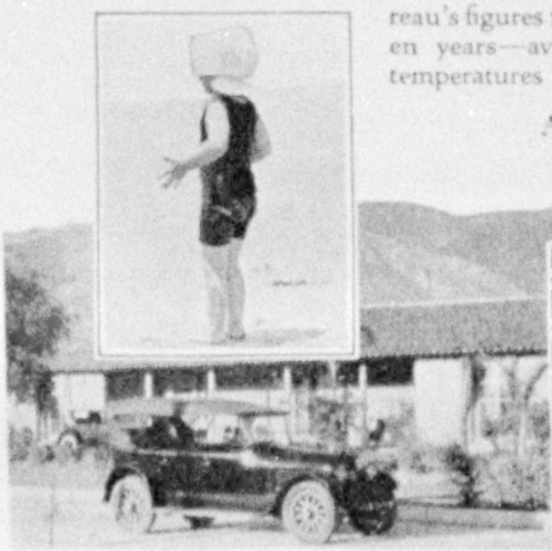

ALL-YEAR CLUB OF SOUTHERN CALIFORNIA,
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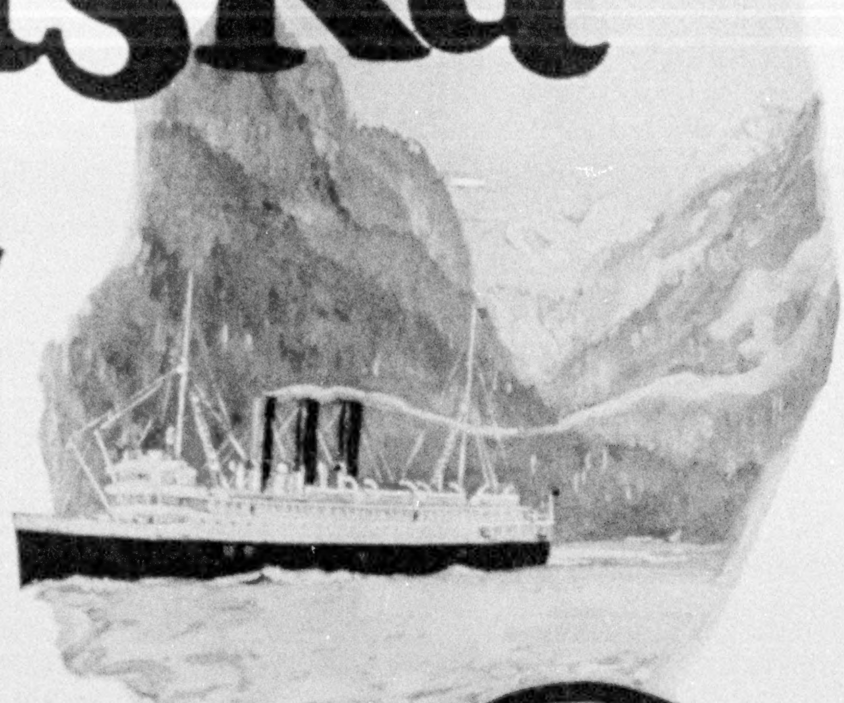
to Alaska

Through sheltered scenic seas



The trip of a lifetime

SEE the land that offers most in scenic glories. Travel west via the great Canadian National route through the Canadian Rockies and at Vancouver board a Canadian National Steamer for the thrilling cruise along the North Pacific Coast.

Skirting the flower-decked base of snow-capped mountains, you see the glories of the famous sheltered scenic seas—totem-pole villages, Russian churches, primeval forests and rivers that tumble down the mountain-sides and into the sea.

Buy the most for your vacation money—it's this cruise to Alaska, a boat trip of 1500 miles each way, every mile of it packed full of amazing sights and scenic thrills.

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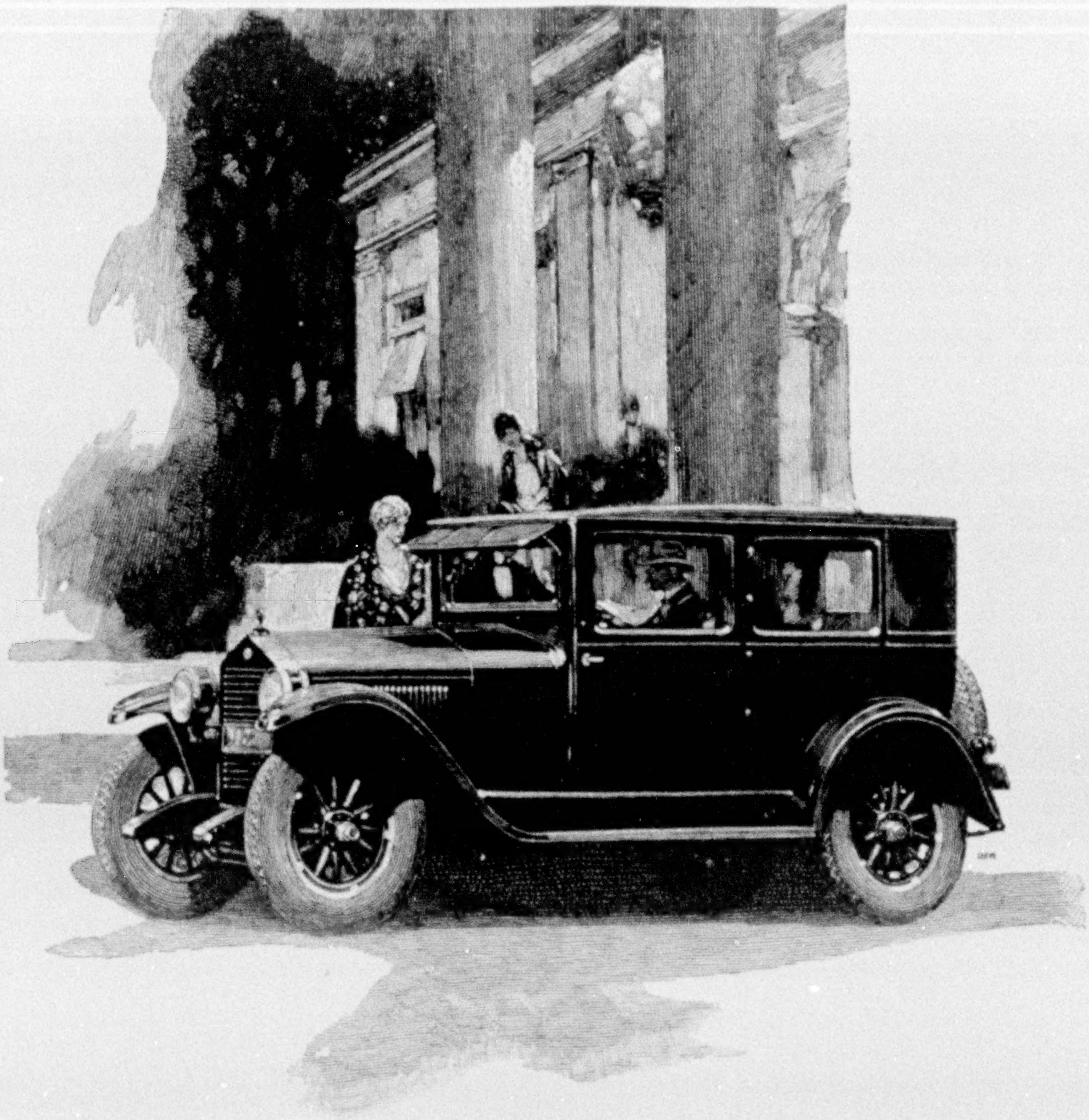

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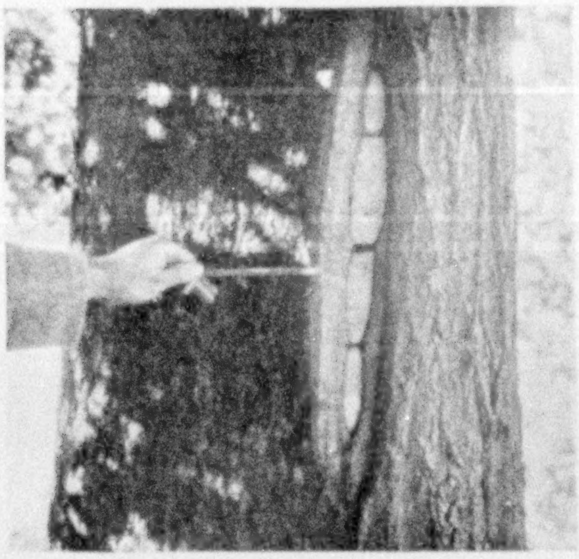

Cement fillings in trees are like dentistry

In the treatment of a cavity in a tooth, the dentist must do at least three things. First, he must clean out all the decay and prevent further decay. Second, he must prepare the cavity so that the filling will stay permanently in place. Third, he must exclude all foreign substance, especially moisture.

The Tree Surgeon must do all of these things and more. He must contend with the swaying and twisting of the trees in the terrific winds. Therefore, Davey Tree Surgeons build their cement fillings in sections, like the backbone in the human body, to allow for this sway and to prevent cracking and breaking. This sectional filling method is a patented process, used exclusively by Davey Tree Surgeons, and is the one thing that made successful Tree Surgery possible.

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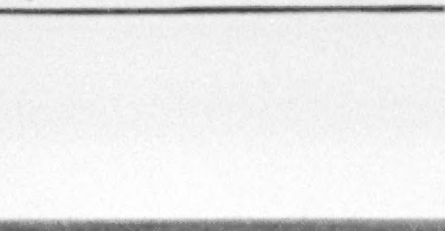

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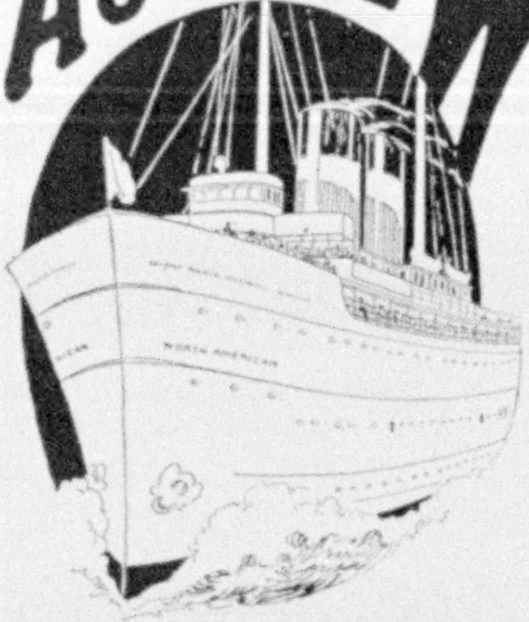

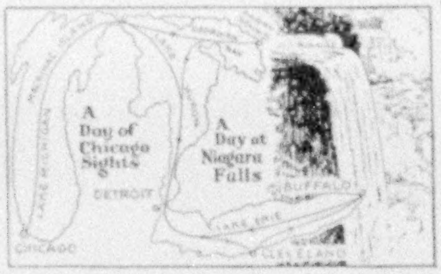

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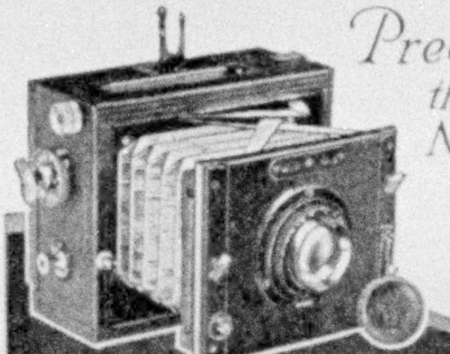

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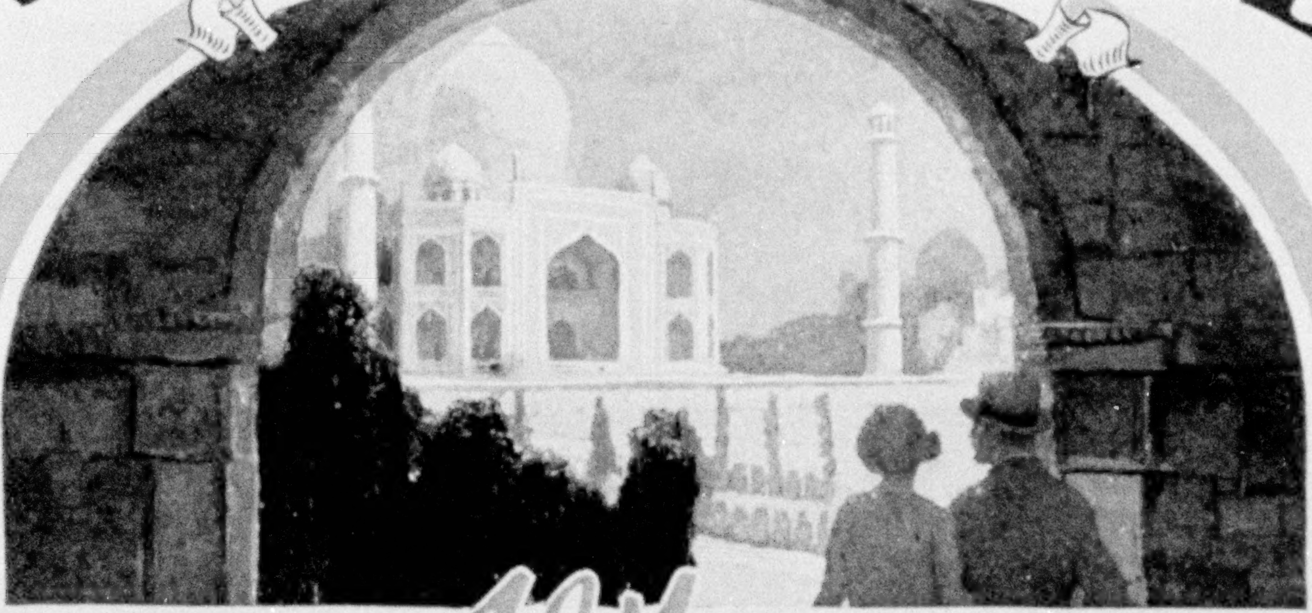

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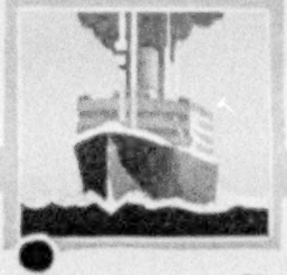

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Millions of dollars, carelessly carried in the pockets of the people, are thus lost annually in the United States.

It is this sort of carelessness that makes Crime easy—and *Crime*, and *Carelessness*, cost our people $3,500,000,000 last year.

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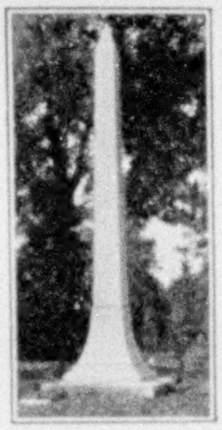

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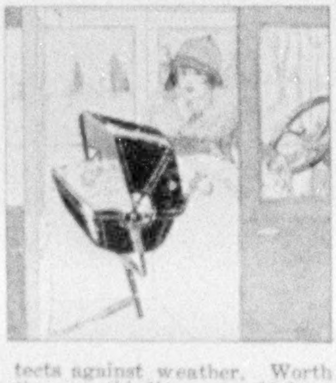

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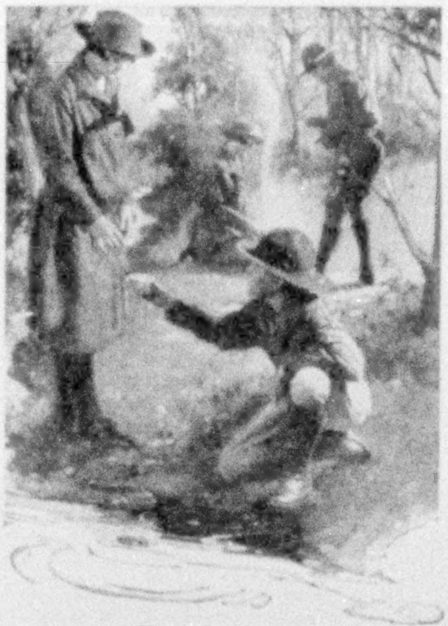
"IF only we had known!" Over and over again these words of helpless self-reproach echo in the hearts of those whose loved ones were taken from them by diseases now known to be preventable.

Perhaps in your own circle some one was stricken with typhoid fever—that sinister disease which comes without warning and strikes with deadly force, which spares neither rich nor poor, high nor low, young nor old, which so often leaves its victims physically bankrupt and subject to other ailments.



DANGER!

THIS is the sort of thing that may mean typhoid fever for the whole family—a satisfying drink of cold, sparkling water that came from no-one-knows-where!

It is never safe to drink from any wayside streams or strange wells. Typhoid inoculation offers immunity to most people for two or three years, but to be absolutely safe, unknown water must be boiled.

Inoculation also tends to protect you from the danger of contracting typhoid right in your own home. In many cities the Health Department gives such inoculations free.

Household helpers who are "typhoid carriers" have been known to infect entire families.

Inoculation against typhoid has no relation to vaccinations for smallpox and diphtheria. It is an added health protection.

Typhoid fever is a disease of filth caused by a germ that is taken into the body through the mouth. The germ is conveyed into the intestines where it rapidly multiplies, sets up inflammation and creates a poison that floods the body. Sewage-contaminated water, unclean milk, shell-fish from polluted water, uncooked vegetables, house flies—all of these may carry typhoid. That is why it is so important that rigid supervision of water, milk and food supplies be maintained in every section of our country. *There need never be another epidemic of typhoid fever.* Science has bestowed a wonderful blessing in offering protection from typhoid. This merciless disease can be made as rare as yellow fever. Inoculation by means of a simple injection of vaccine under the skin will in most cases prevent typhoid. The injection is repeated at intervals of a week until three treatments have been given. No scar is left. In the rare cases where typhoid is contracted, even after inoculation, this protection makes the siege much less severe.

Campers, hikers, vacationists and all persons who are traveling, as well as those who regularly eat in public places should be the first to be inoculated against typhoid.

It is true that at times people who are exposed to typhoid do not contract it. They are temporarily immune. But it is *never* safe to take immunity for granted. *Be inoculated and advise others to protect themselves.* Could you ever excuse yourself had you advised a friend against inoculation who subsequently contracted the disease? Make an appointment with your doctor for yourself and all your family. Avoid danger so far as possible regarding what you eat and drink.

Typhoid fever kills one out of every ten persons who have it. Those who recover are left in such a weakened condition that for three years following, the death rate among such persons is twice the normal rate.

Wherever cities protect their drinking supply from sewage or purify the water by chlorination the death-rate from typhoid drops. A marked reduction also takes place in communities where milk and food supplies are carefully protected and food handlers thoroughly inspected.

The value of typhoid inoculation was proved during the World War. Inoculation of our four million men was compulsory. In France and in our training camps at home there was practically no typhoid in our ranks.

Contrast this with the records of the Spanish-American War. There *one* out of every *five* contracted the disease.

The Metropolitan Life Insurance Company will be glad to mail its booklet, "The Conquest of Typhoid Fever" to all who are interested in stamping out this disease.

HALEY FISKE, *President.*

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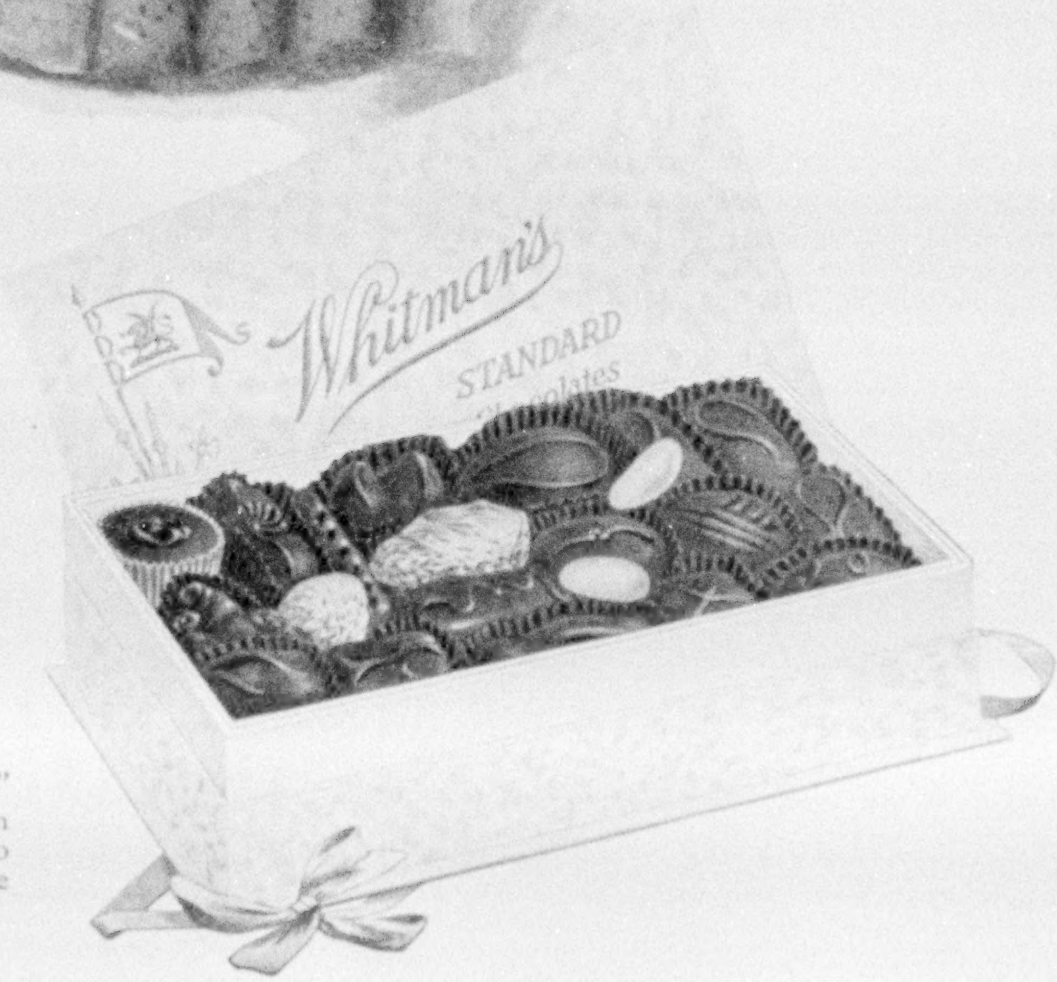

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VOL. XLVII, No. 6 WASHINGTON JUNE, 1925

THE NATIONAL GEOGRAPHIC MAGAZINE

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A CARAVAN JOURNEY THROUGH ABYSSINIA

From Addis Ababa Through Lalibela, the Strange Jerusalem of Ethiopia, in Search of New Grains for American Farms

By HARRY V. HARLAN

ONE of the most famous women rulers in the history of the world sat upon the throne of Abyssinia nearly 3,000 years ago, but the present empress of that country, a daughter of Menelik II, is not allowed to govern her people. Waizeru Zauditu is merely the nominal head of this country, which was noted as the home of the Queen of Sheba in the days of Solomon. The actual ruler of Abyssinia, or Ethiopia, as its natives prefer to call it, is Ras Taffari, the regent and heir apparent, son of Ras Makonnen of Harar, and cousin to the Empress.

There has been an increasing sentiment on the part of Ras Taffari and others to widen Abyssinia's contact with the outside world. At the end of the World War, Ras Nado, governor of the province of Goré, was sent to congratulate the Allies on their victory. In the course of his tour he visited the United States, and later, in Abyssinia, I heard him describe his visit to the Ford automobile plant at Detroit.

Ras Taffari upset convention when, in October, 1922, he visited Aden, and a few hours after his arrival was viewing the city from the first airplane he had ever seen. In 1924 he did a still more astounding thing. In the early summer he made an extensive visit to Europe, thus breaking a century-old precedent.

The most interesting event of the regent's trip took place in London, where the King of England presented to him the crown of King Theodore of Abyssinia, which was captured at Magdala by the British in 1868.

When Ras Taffari went to Europe he took with him lions and zebras, which have been the royal gifts of Abyssinian monarchs to the officials of other countries for centuries. To the British monarch and to the President of France he presented lions; zebras were given to lesser personages.

Ras Taffari met the wonders of civilization smiling and impenetrable. He listened and watched, but advanced no opinions.

THE AUTHOR'S FIRST INTERVIEW WITH RAS TAFFARI

My first interview with Ras Taffari took place early in November, 1923. An appointment had been made for me by Dr. T. A. Lambie, an American physician of Addis Ababa, capital of Abyssinia. While we were waiting in the reception room of the palace, the servant, who came to escort us to the ruler, opened the door a moment too soon and revealed His

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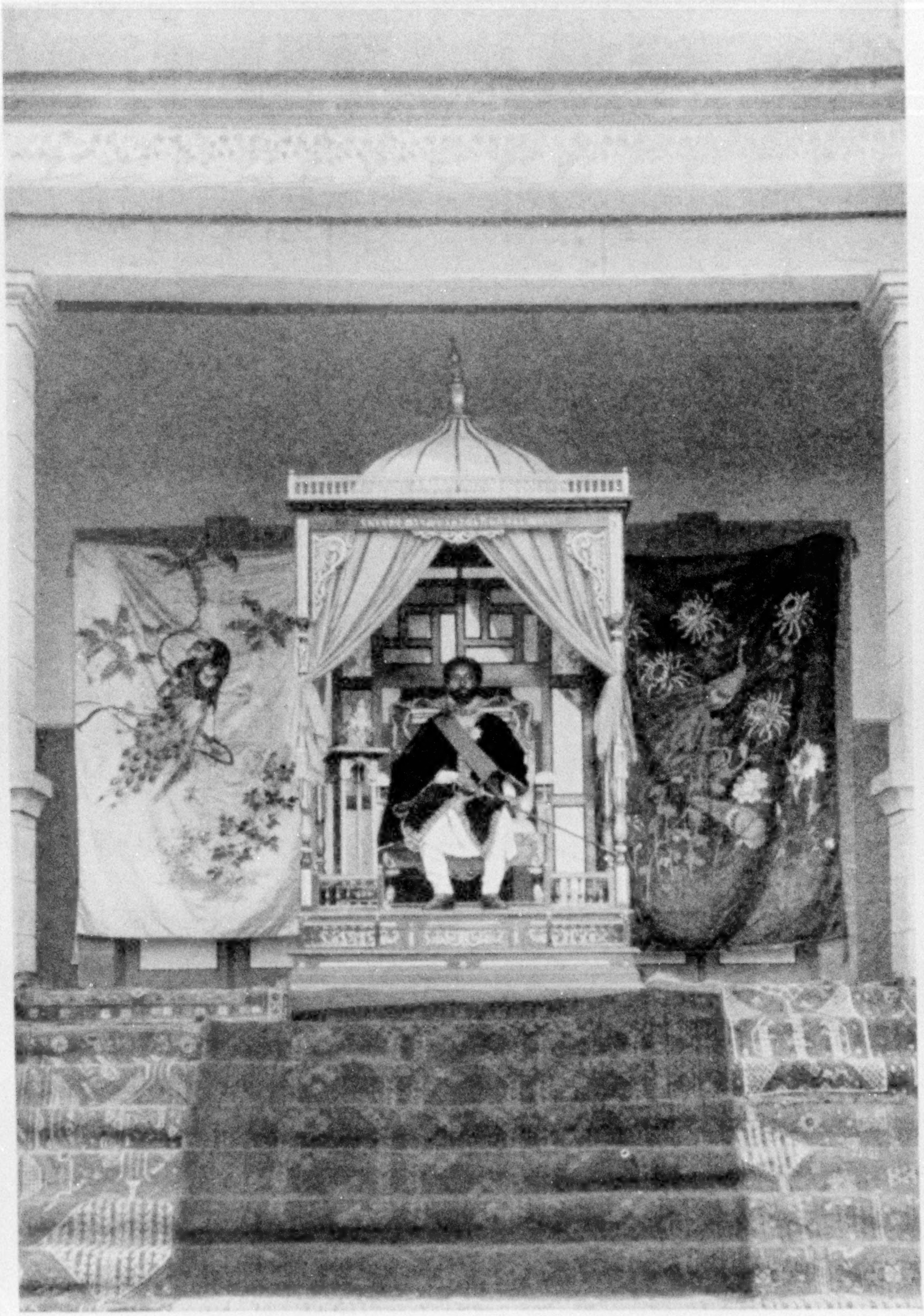
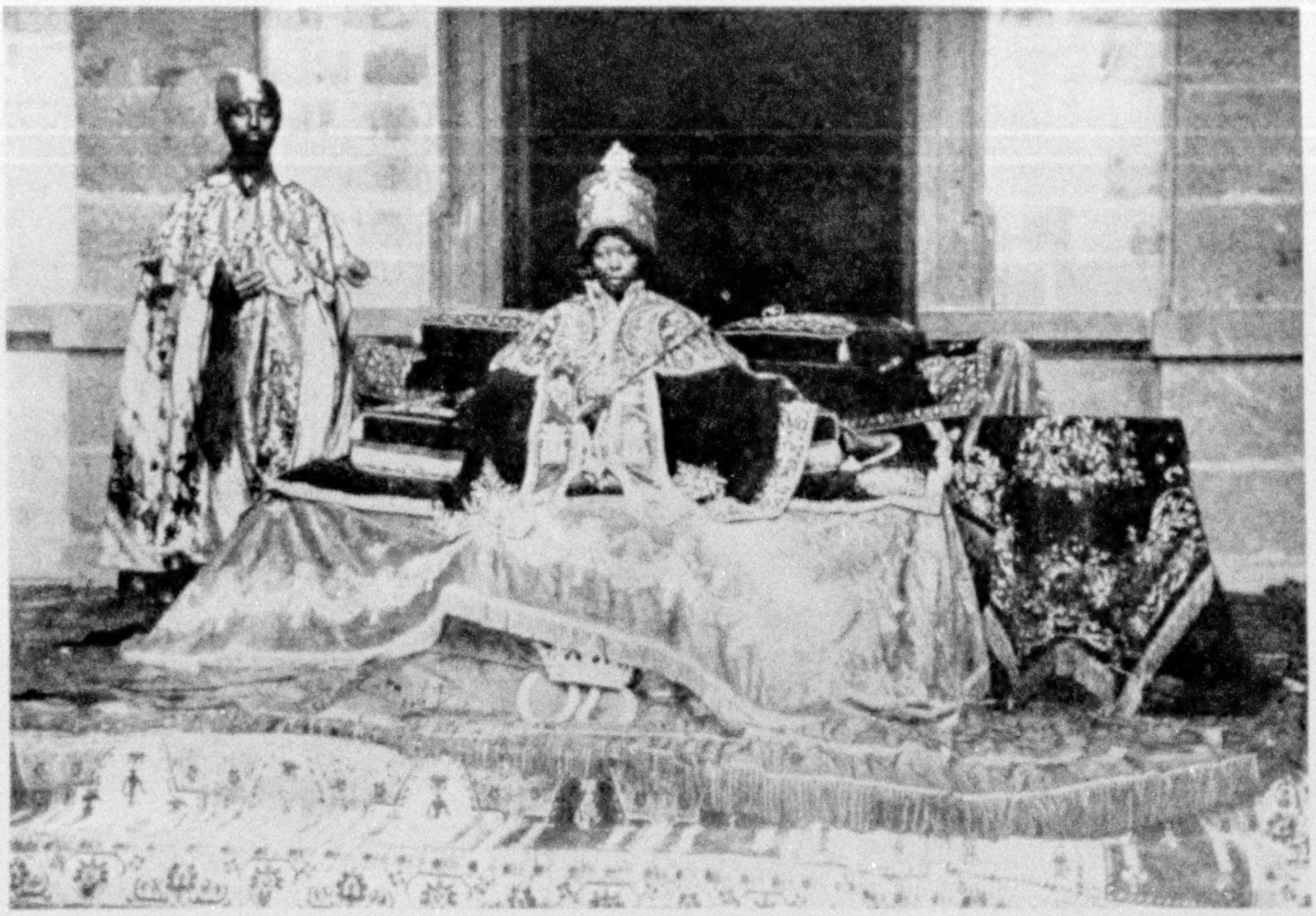


Photograph by E. A. Salisbury from Ewing Galloway

RAS TAFFARI, PRINCE REGENT OF ABYSSINIA, ON HIS THRONE

He is actual ruler of the country, while Zauditu, daughter of the late Menelik II (see illustration on opposite page), is the nominal empress. Ras Taffari is well educated and broad-minded. He is an absolute monarch, ruling over 8,000,000 natives, and is heir to the imperial throne.



Photograph from A. N. Mirzaoff

THE EMPRESS ZAUDITU IN HER ROYAL ROBES

The rulers of Abyssinia for centuries have styled themselves *Negus Negusti* (King of Kings), and the whole royal line is supposed to have descended from the son of the Queen of Sheba and King Solomon.

Highness arranging his draperies. When we entered he was seated exactly in the center of a divan, with twin cushions precisely placed at either end.

Ras Taffari is a man of slight build, with an olive skin, an alert, intelligent face, and wonderful eyes. His delicate hands, with exceedingly long, slender fingers, however, are his most remarkable physical features. They fascinated me and throughout the interview I could hardly take my eyes from them.

The purpose of my interview was to pave the way to a request for travel passes. I explained that I was sent by my Government to collect seeds of Abyssinian plants for cultivation in America.

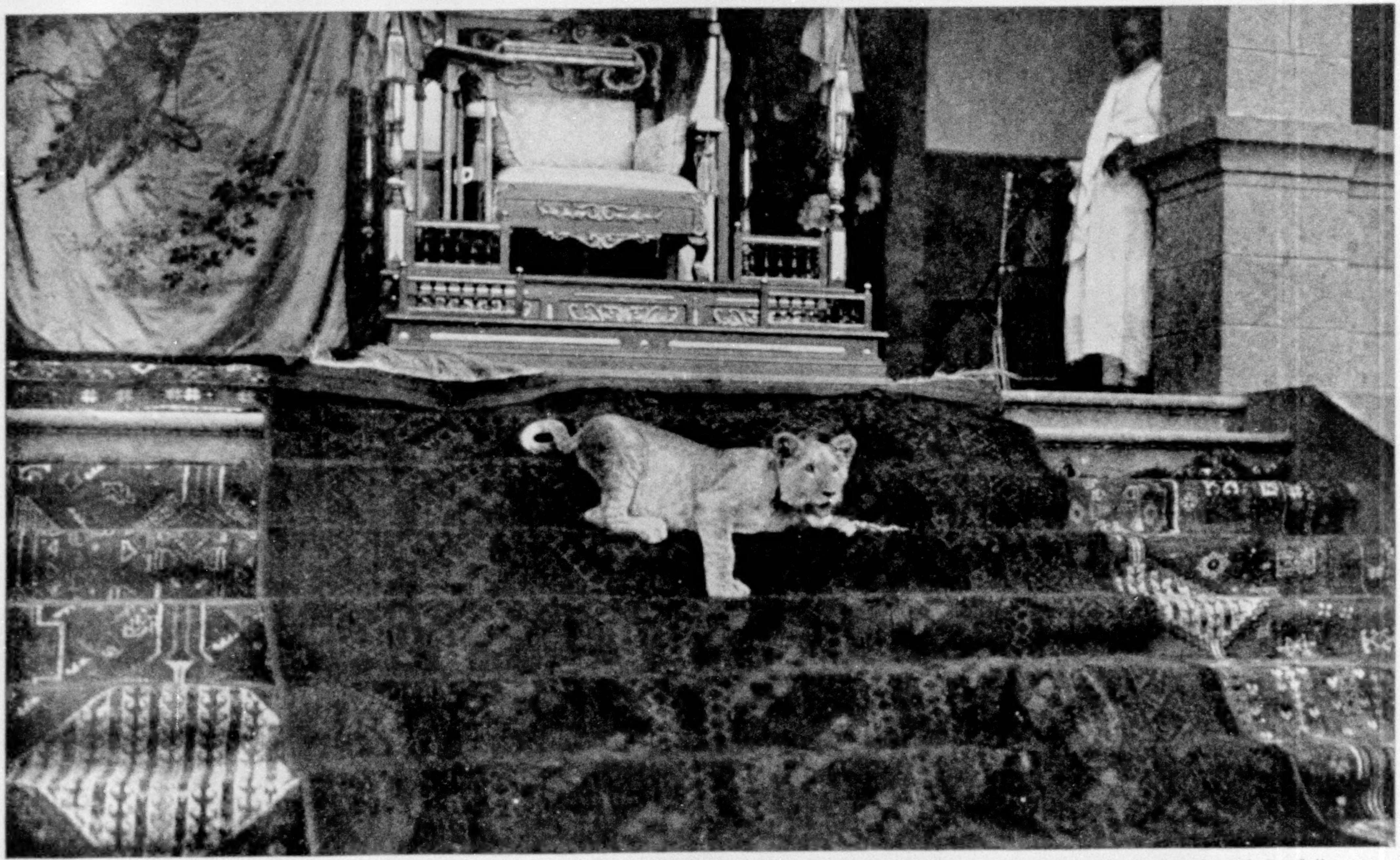
Ras Taffari expressed great amazement that a country such as his could furnish things of value to the United States. I told him of the many valuable importations of plants we had made and of our hope of using as breeding material primitive wheats and barleys that were not of great value in themselves.

It was necessary that he understand fully the object of my trip, for the regent's rule is absolute. If a pistol is to be imported, the matter comes before Ras Taffari; if there is unrest in Tigré, it is he who must quiet it; if a foreigner wishes to go to Goré, it is of the ruler that the request for passes is made.

Now, I wanted not only to travel, but to travel through the heart of Amhara, which comprises the northwest quarter of Ethiopia (see map, page 618). This is the historic region of Abyssinia, inhabited by Amharas, a Hamitic-Semitic people.

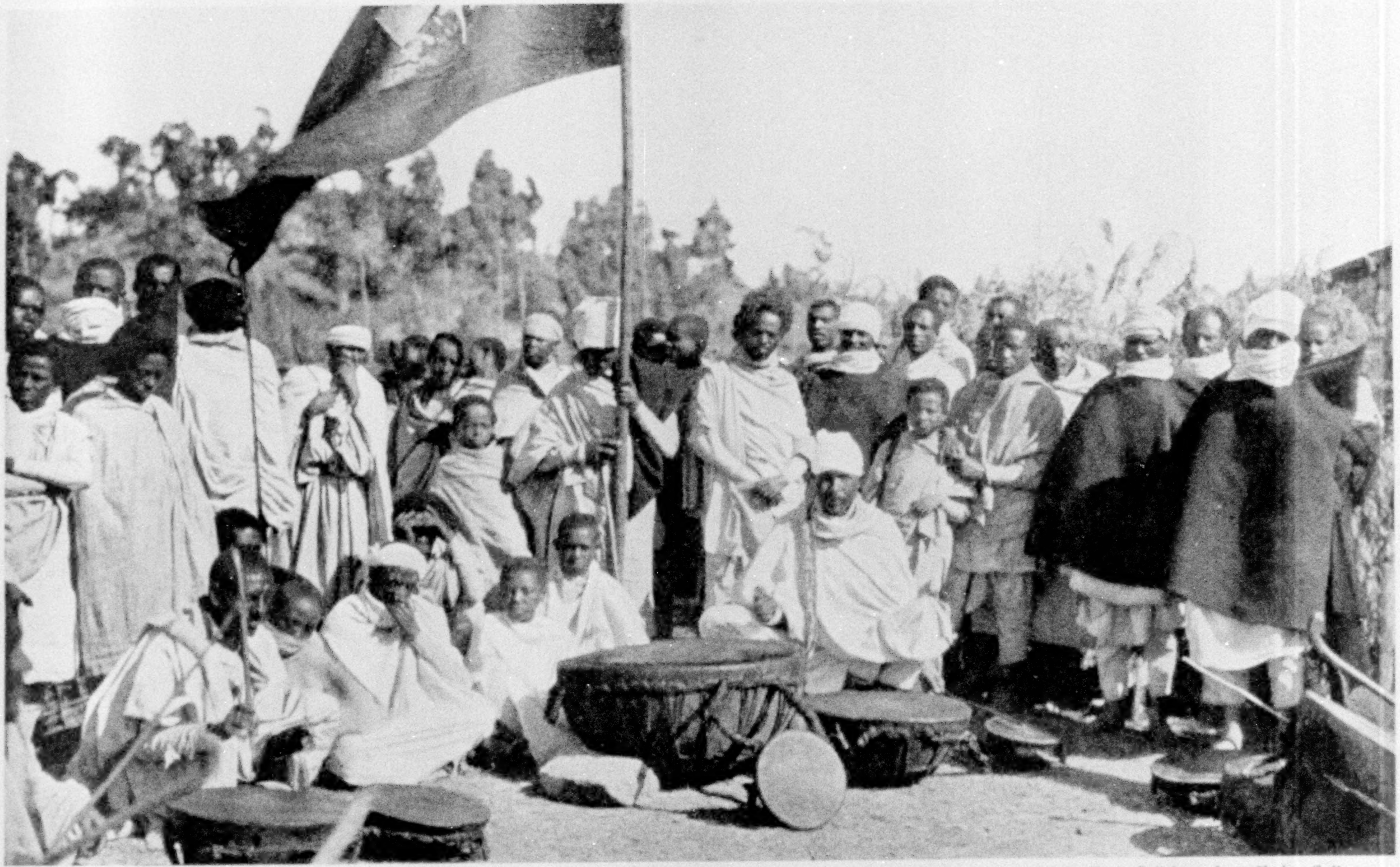
RAS TAFFARI KINDLY DISPOSED TOWARD AMERICANS

Many Americans think of the Abyssinians as Negroes. We are so accustomed to look upon Africa as the home of the Negro that this assumption is quite natural. Many years ago the Negroes of America sent a mission to Ethiopia to congratulate Menelik on being the ruler of the only independent Negro country. He refused to receive the mission. The



Photograph by E. A. Salisbury from Ewing Galloway

A LION CUB PLAYING IN FRONT OF THE THRONE OF THE PRINCE REGENT: ABYSSINIA, LIKE GREAT BRITAIN, HAS ADOPTED THE LION AS THE SYMBOL OF ITS AUTHORITY



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DRUMMERS TO THE PRINCE REGENT PARTICIPATING IN A RELIGIOUS CEREMONY OUTSIDE A COPTIC CHURCH

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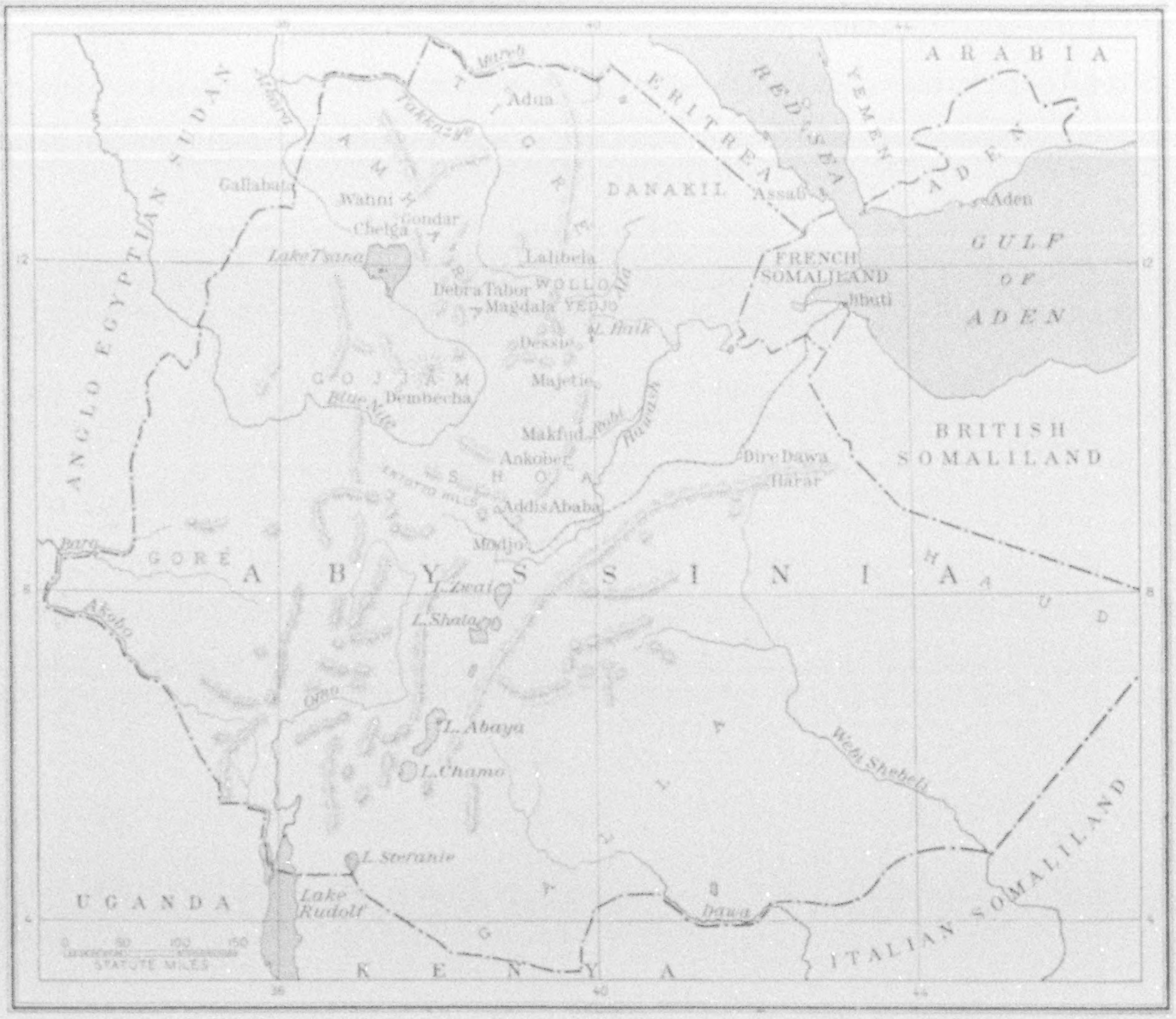
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ERITREA
RED SEA
YEMEN
ADEN
TIGRE
AMHARA
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Adua
DANAKIL
Assab
Aden
GULF OF ADEN
Gallabat
Wahni
Gondar
Chelga
Lake Tsana
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Drawn by James M. Darley

A MAP OF ABYSSINIA

The author's journey by caravan led from the capital, Addis Ababa, northward by way of Ankober, capital of the province of Shoa, the market place of Makfud (see text, page 635), Majetie, and Dessie; thence to the Abyssinian Jerusalem, Lalibela (see pages 651-661), at which point the caravan turned west and reached Gallabat, on the Anglo-Egyptian-Sudan border, by way of Debra Tabor, Lake Tsana, source of the Blue Nile, and the ruins of the medieval Portuguese city of Gondar. Abyssinia's chief means of contact with the outside world is through the railroad between the port of Jibuti, in French Somaliland, and Addis Ababa.

Amharas are a proud people and have looked upon their negroid tribes as inferior beings.

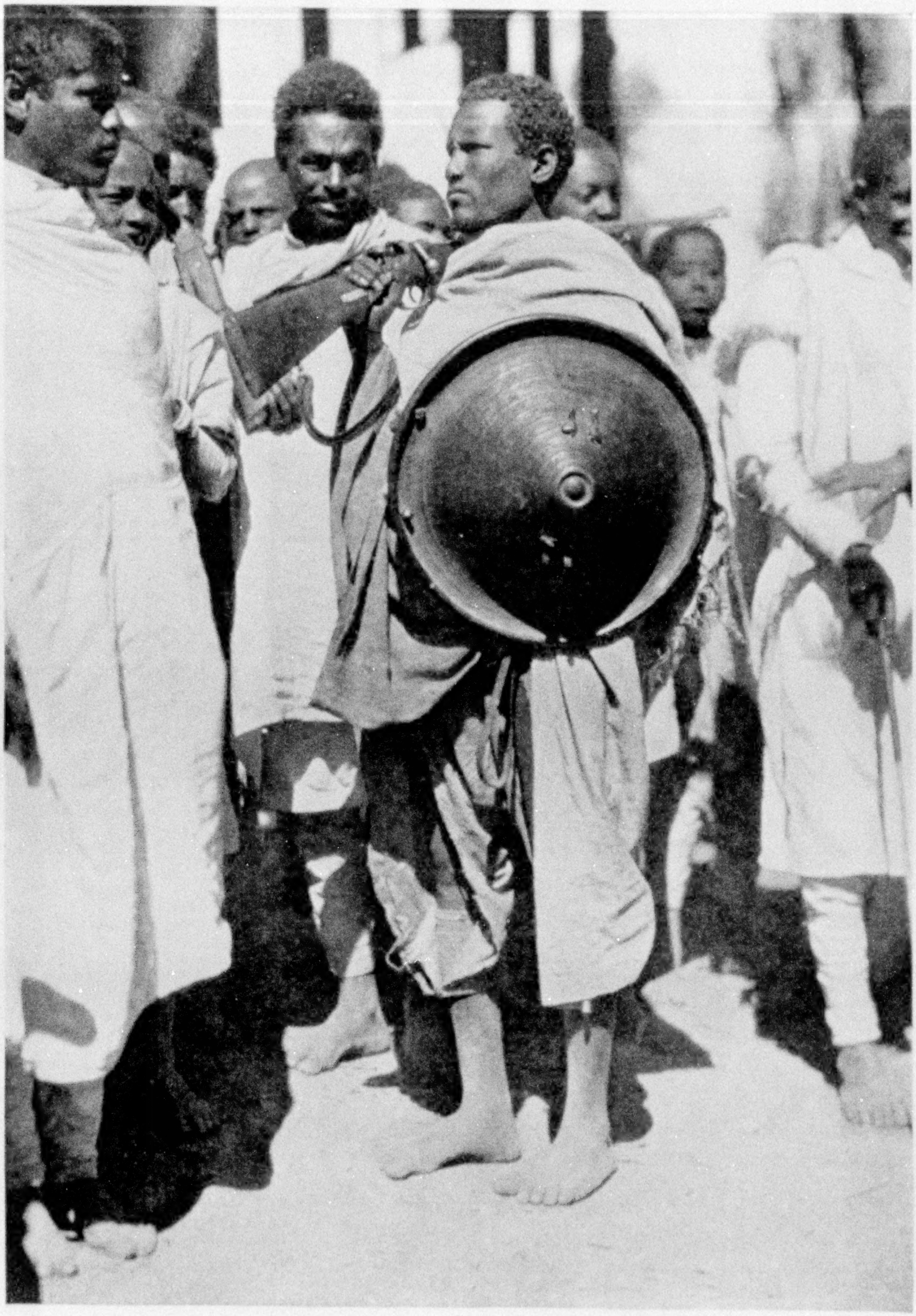
Unfortunately, the United States has no resident agent in Ethiopia, and when I requested leave to travel through Amhara by way of Gondar I ran into difficulties. Although the ruler is very favorably disposed toward Americans, and is willing to extend unusual courtesies to them, he first makes very sure of their mission and satisfies himself that they are as they represent themselves.

It was several weeks before I obtained my papers, but in the interval Ras Taffari was very kind, entertaining me at tea and later at dinner.

Eventually all doubts concerning me were dispelled and the permits were granted, but there lingered to the last some suspicion regarding my companion, Mr. Sewall. My mission was an understandable one, but it was not so easy to comprehend why an American student at Oxford should desire to endure two months of hard travel and the exposure of camp life largely for pleasure!

FAST-GROWING EUCALYPTUS TREE FIXES LOCATION OF CAPITAL

While the ruler was making up his mind as to whether we were Americans and whether our mission was so simple as we had represented it, we spent three interesting weeks in and around the capital.



Photograph by E. A. Salisbury from Ewing Galloway

ARMED ABYSSINIANS OF ADDIS ABABA

There is no trouble afoot; it is merely the custom of the soldier to walk the streets of his capital city fully accoutered. The central figure is the shield-bearer of an officer. The shield is of rhinoceros hide and is a traditional emblem of rank.

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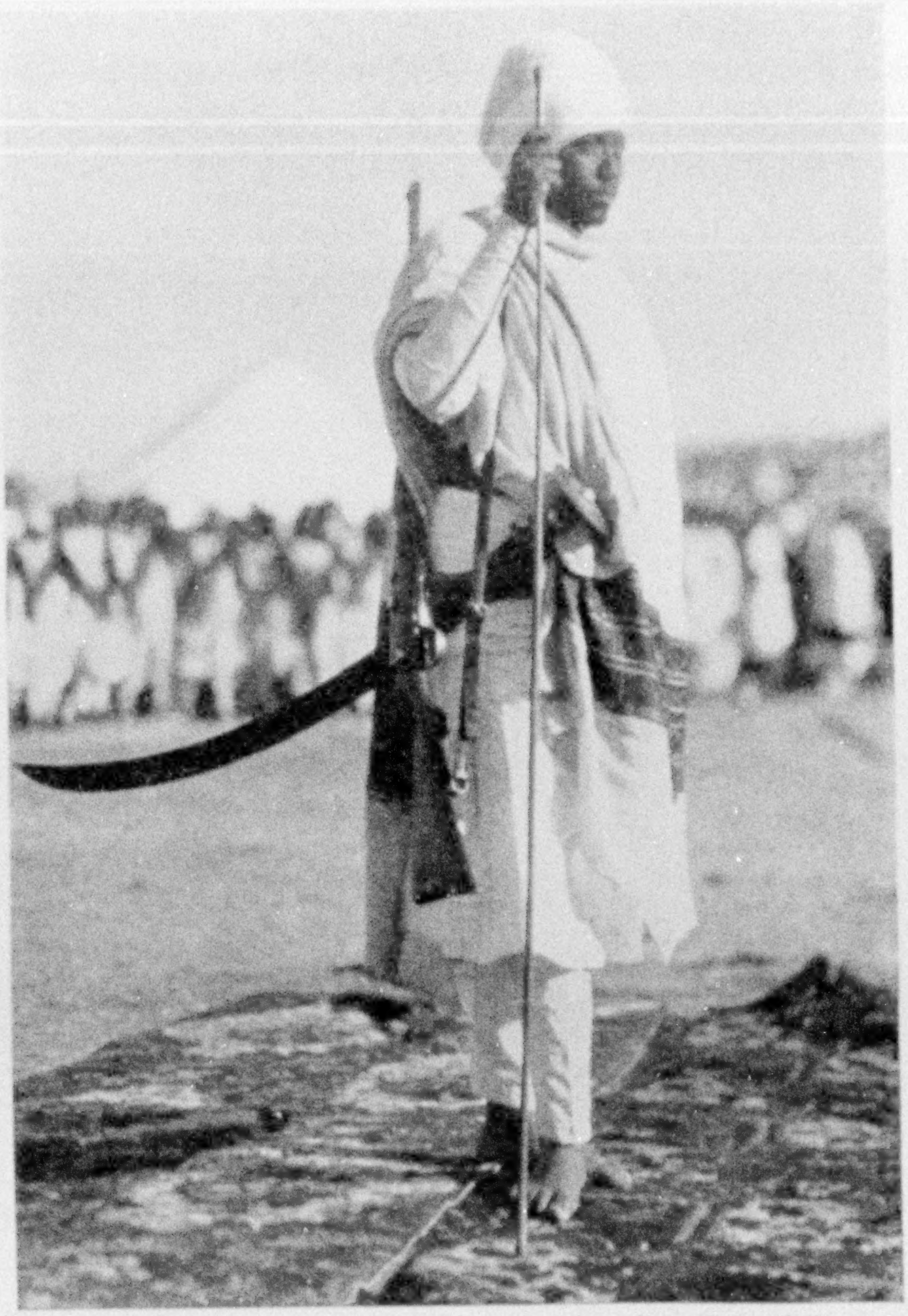


Photograph by E. A. Salisbury from Ewing Galloway

A CHAMBERLAIN OF RAS TAFFARI'S COURT

The embroidered toga shows that he is a chieftain. The wand is the staff of the office of chamberlain. He uses it vigorously in clearing the path for the prince.

A capital in Ethiopia for centuries meant little more than the temporary home of the king, or, in terms of the province, the feudal representative of the king. Such capitals, or homes, were commonly situated on sharp peaks surrounded by military defenses. A rambling village usually sprang up about the place; the population increased and the available firewood decreased. Eventually the capital was transferred to a location where fuel was more abundant.

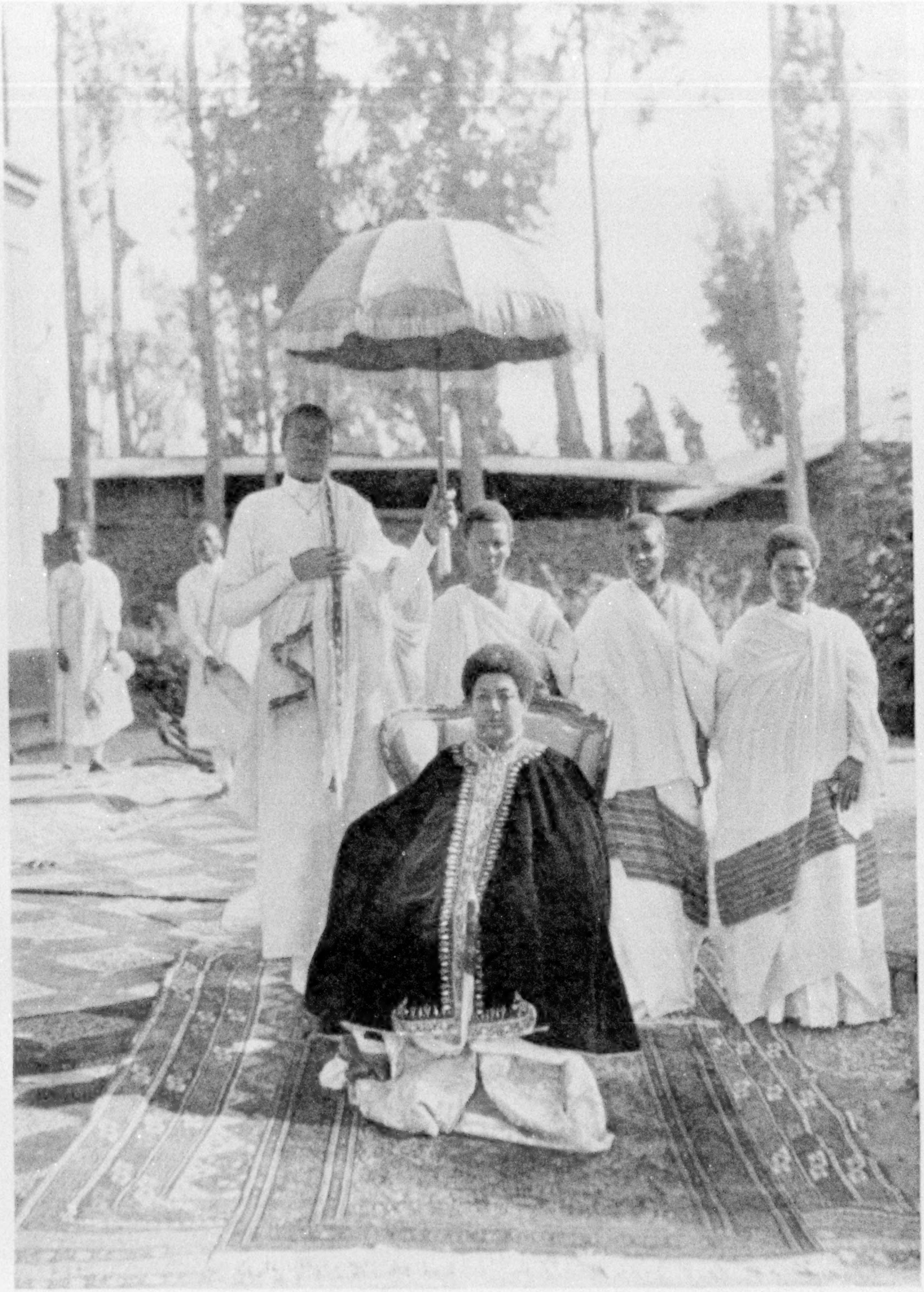
In the case of Addis Ababa foreign contacts interfered with the natural course of events. Menelik had established this new capital in a forested section of the Entotto Hills, along the base of which the usual random village arose. About this time foreigners began to take an interest in Ethiopia. Many Greeks, Armenians, and Parsees built stores in the new town and several European governments erected legations. The French started railway construction in its direction from the coast.

Then the trees began to disappear, and once more Abyssinian officials advocated the removal of the capital. The foreigners objected because of the loss of their improvements. The opportune introduction of the eucalyptus by Menelik solved the fuel problem and probably settled the location of the capital for all time. To-day the city is in a forest of tall eucalyptus trees, none of which is more than 30 years old.

NO ELECTRICITY, GAS, OR SEWERAGE IN ADDIS ABABA

Addis Ababa is a straggling city. The principal streets are "paved" with round, waterworn bowlders from 6 to 10 inches in diameter, and the two main suburban roads along the base of the hill are surfaced with a thin macadam. Wheeled traffic is uncommon, most residents going from place to place on horseback. It is a journey of an hour and a half from the American mission, on one edge of town, to the British Legation, on the other.

A fairly good road runs from the residence of Ras Taffari to that of the Empress, and several streets are passable to the half-dozen automobiles, which are limited to the city and to one road which is improved for some distance westward. Over the country as a whole there is no

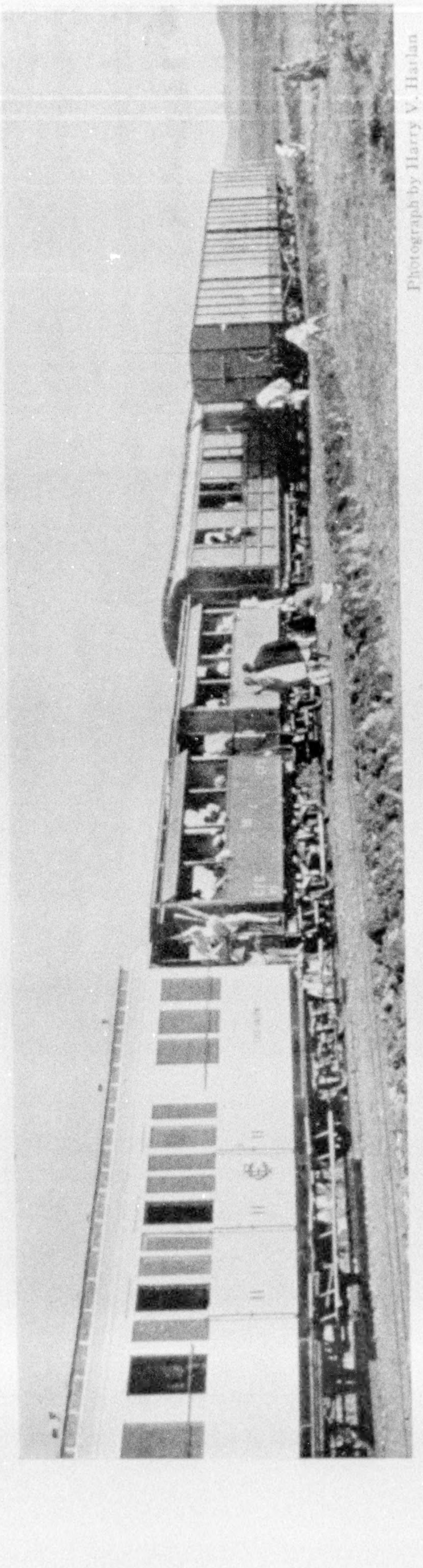


Photograph by E. A. Salisbury from Ewing Galloway

WAIZERU MENEN, WIFE OF THE PRINCE REGENT OF ABYSSINIA

The princess is not in her state robes. A manservant is holding the parasol over her head and the women are her slaves. The palaces of the ruling family are modest abodes, the only evidence of luxury being the costly oriental rugs, of which all the nobility of Abyssinia are especially fond.

XUM



Photograph by Harry V. Harlan

A TRAIN ON THE LINE FROM JIBUTI TO ADDIS ABABA

The capital of Abyssinia is 500 miles by rail from the coast of the Gulf of Aden (see map, page 618). Toy trains make two trips a week of three days each, and can run only during the daytime, due to danger from marauding Somalis and Danakils, nomadic peoples of the semidesert. All Addis Ababa goes to the station to meet the train, with its load of weary, dirty passengers.

possibility of wheeled traffic of any kind.

To ride in an automobile in the city is more or less of an adventure. The streets are always filled with pedestrians, each one of whom is obsessed with the idea that he must discover how long he can keep in front of the machine by running. The native pack ponies coming to market are unused to autos and gallop wildly along the road, causing their packs, when loaded with hay, to slip sidewise and finally beneath them, thus scattering grass for blocks.

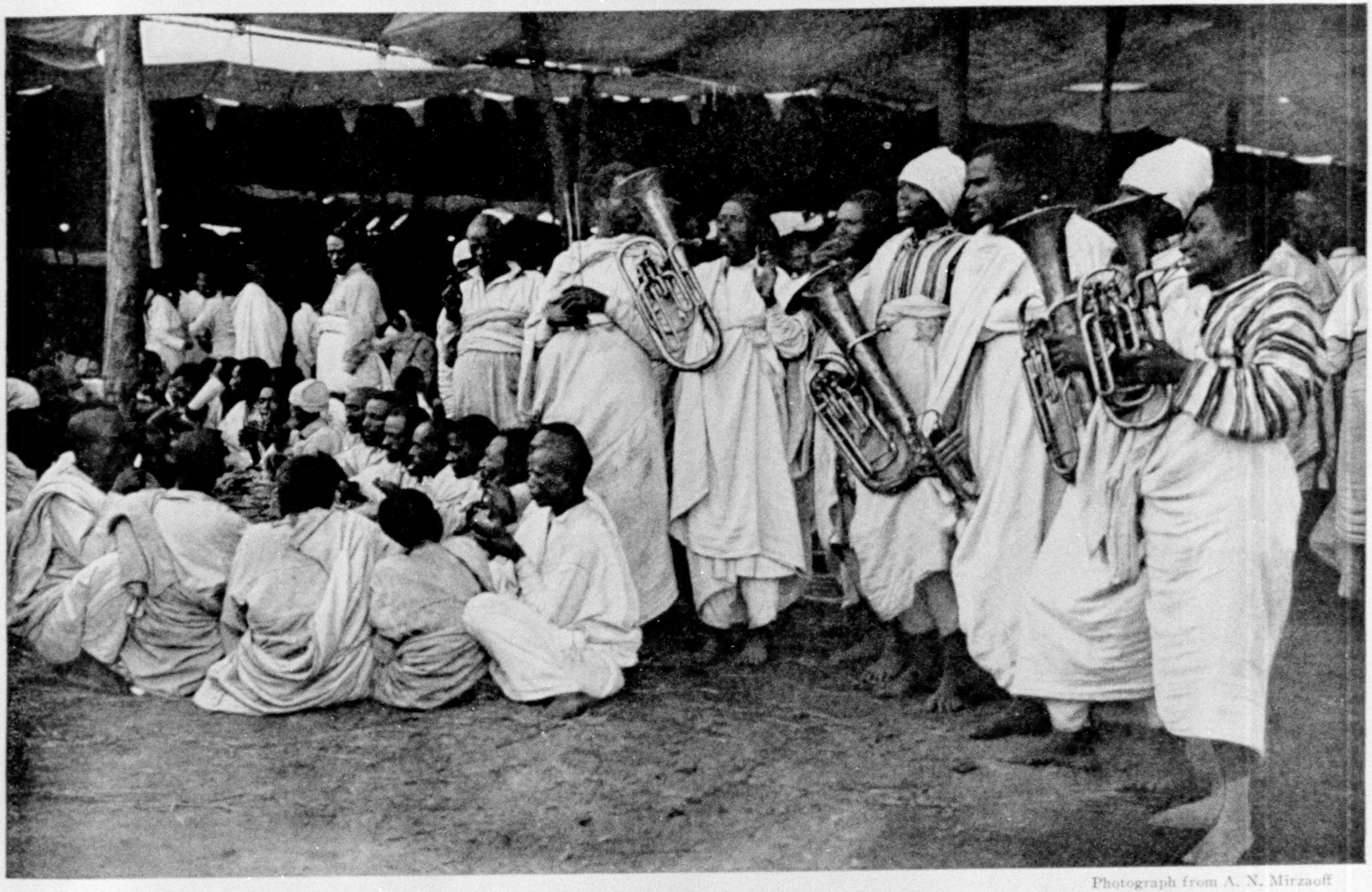
The store buildings are one- or two-story adobe and stone structures covered with galvanized-iron roofing. The stocks of goods are small and inferior, although at one store, run by a Parsee, a considerable assortment of articles is for sale. Besides the stores, there are the thousands of grass-roofed huts scattered about the hills, where the native population lives.

There is no electricity, no gas, no water or sewerage system, but there is a "movie."

All the town goes to the station in the evening when the train arrives from Jibuti. The coaches of the train are filled with all kinds and classes of people, who arrive weary and dirty.

It is only 500 miles from the coast, but the toy train has labored heavily for three days to accomplish the journey. It runs only in daylight hours—a practice due in part to danger from the Somalis and Danakils, nomadic peoples of the semidesert, for it would not be difficult to remove a rail, plunder the wreck, and disappear in the darkness. Trouble was experienced in the days of construction, and the railroad has pushed its influence only a few miles from the right of way. Two hours' ride on horseback brings one among nomads living as they have lived from time immemorial.

The harvest was coming on and I had all too little time at Addis



Photograph from A. N. Mirzaoff

MUSICIANS PROVIDING MUSIC FOR EMPRESS ZAUDITU'S CORONATION RAW-MEAT BANQUET

The Abyssinian seldom cooks his meat, but he is a stickler for eating only the flesh of animals killed by persons of his own faith. A Mohammedan will not eat a sheep killed by a Copt, or *vice versa* (see text, page 663).

Photograph from A. N. Mirzaoff

GUESTS AT A RAW-MEAT CORONATION BANQUET

This feast, known as a "guebeur," was given when Empress Zauditu ascended the Abyssinian throne, once occupied, according to tradition, by the Queen of Sheba.

Ababa to make my arrangements. The white residents of the capital were of invaluable assistance. Most of my personnel was secured on the recommendations of the British Legation and of Dr. Lambie.

DISSENSION AMONG MEMBERS OF CARAVAN INSURED SUCCESS

There are a few details of organization to which particular attention should be paid. The first is to be well supplied with interpreters. There should be at least two, preferably men who do not like one another, for there are several hazards in having but one interpreter. In the first place, you are at his mercy, and are told only the things that he is willing that you should know. If he wishes to go a certain route, he tells you that there is but one road. Again, he may fall ill and thus leave you without means of communication.

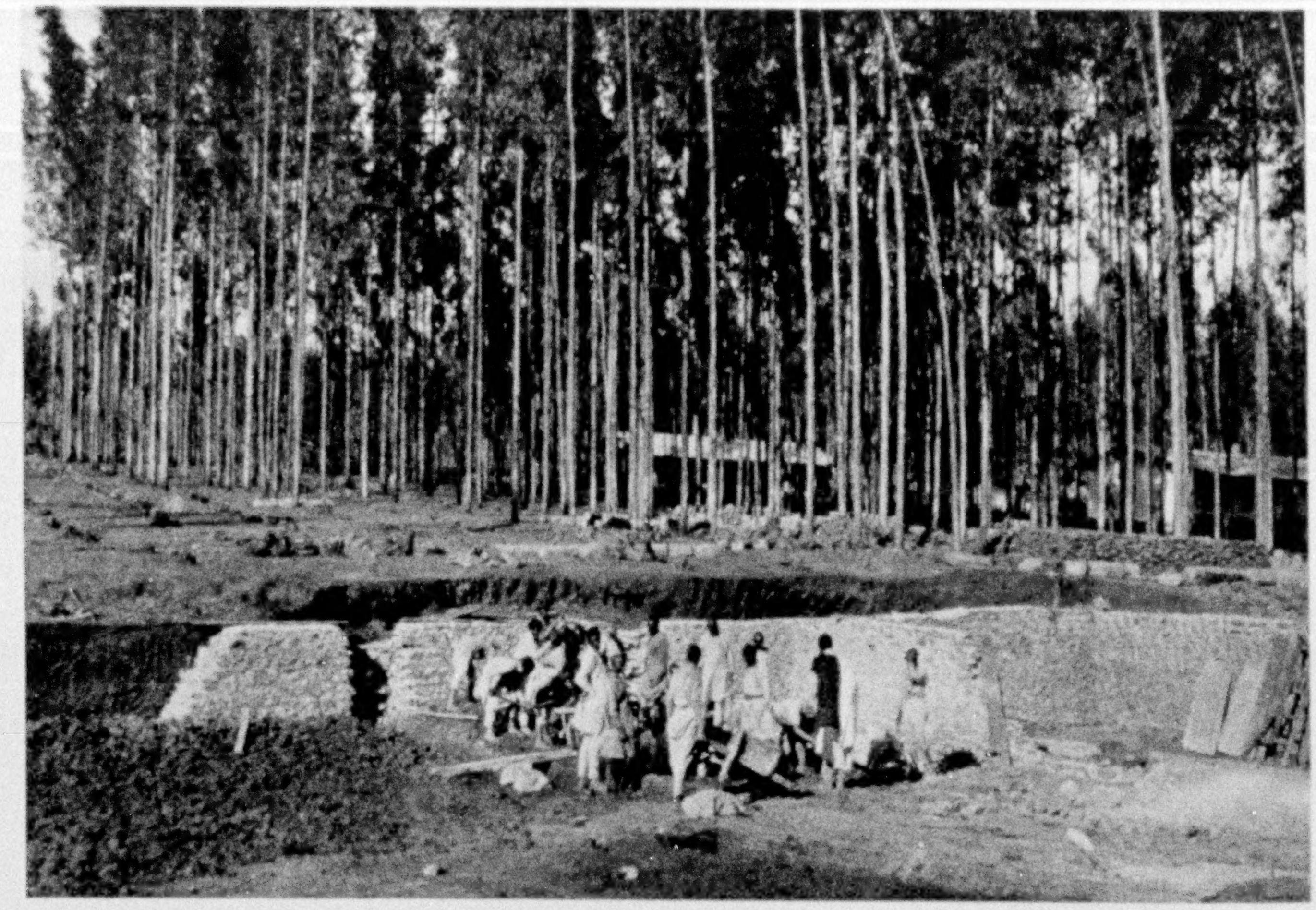
With my caravan I took three men who spoke English and one who spoke French. It was fortunate that I had them, for my headmen had planned the trip to suit themselves.

A second end to be secured in organization is dissension in camp. There can be no concerted action and little individual sabotage in the way of delaying the marches, if there are factions among the servants. To this end both Mohammedans and Christians were hired as helpers.

I was looking for dissension and got it—in fact, far more than was necessary. However, the Mohammedans proved to be very useful in tying up the Christians when the latter were drunk.

The more important chieftains presented me with large quantities of beer and *tej* for the men. The Mohammedans did not drink, since it is contrary to their religious belief. The Christians, on the other hand, not only drank, but not too playfully chased one another with razor-edged hunting knives and tried to throw one another over precipices. Some nights a surprising proportion of the caravan was tied up. After a time we commenced tying when the first dull thud of blows began to sound, and without waiting for the knives to be unsheathed.

The caravan as finally organized con-



Photograph by Harry V. Harlan

EXCAVATING FOR AN AMERICAN MISSION HOSPITAL: ADDIS ABABA

For centuries Abyssinian capitals were only temporary abodes, increase in population and consequent decrease in available firewood necessitating removals to locations where fuel was more abundant. Addis Ababa, founded in 1892 by Menelik II, has remained fixed because the astute ruler introduced the rapidly growing eucalyptus tree. To-day the city is in the midst of a forest of these trees, none of which is more than 30 years old (see text, page 620).

sisted of about 40 men, including the soldiers, of which there were usually 10. The mules numbered 35 or 40, depending on how many the soldiers had with them at the moment. My own mules amounted to 30. The exact number of men with me I never learned. I knew the number on both our payrolls, but several of my servants had servants of their own, so that the total was considerable.

The organization of the caravan was nearly completed and we were about ready to leave Addis Ababa, when I was stricken with a tropical fever having typhuslike symptoms. For several days I was very ill and owe much to the constant attention of Dr. Lambie. As soon as I was able to travel we started out along the base of the Entotto Hills for Ankober (see map, page 618).

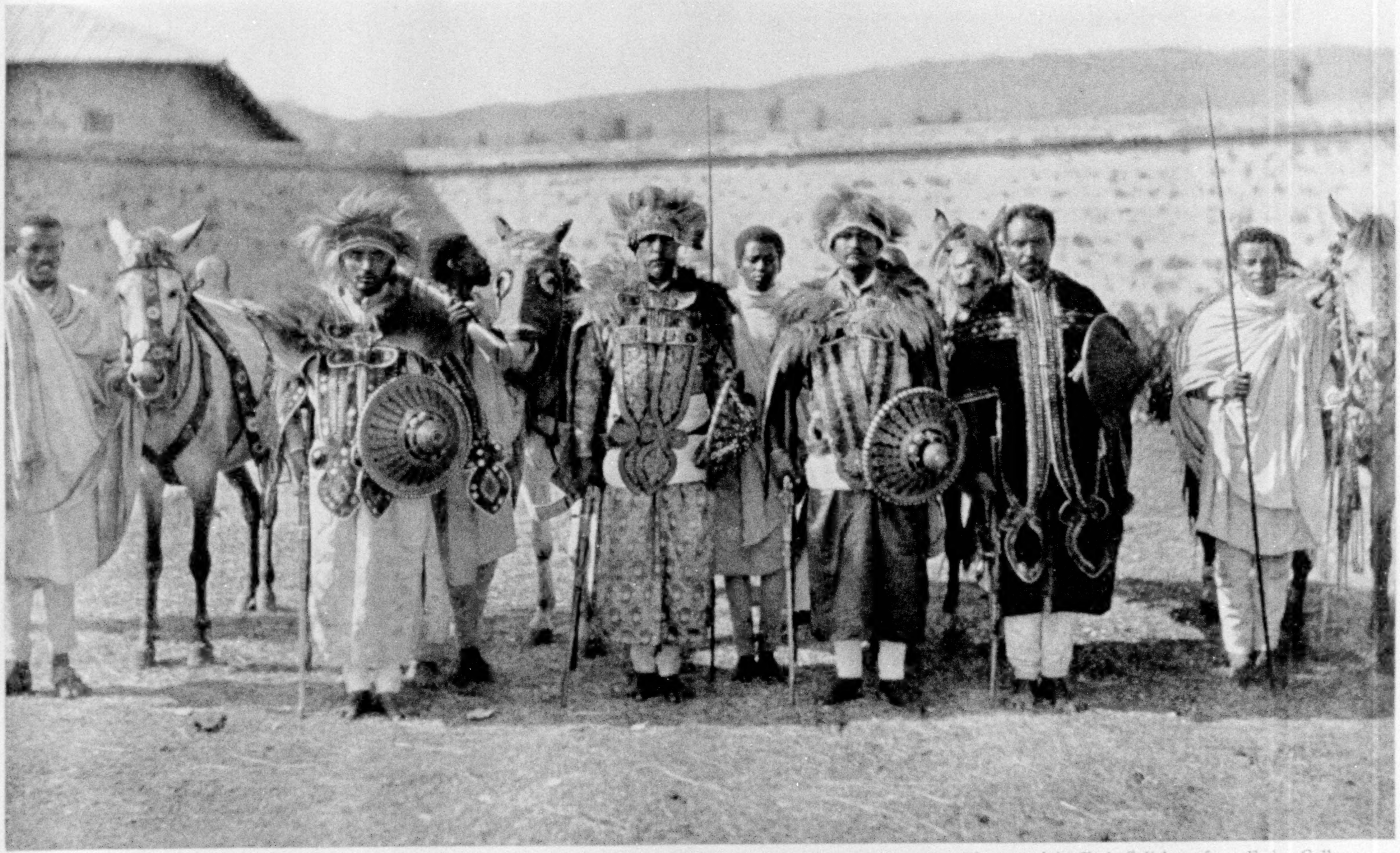
The first day and especially the first night were memorable for me. I was weaker than I had thought, and long before we reached camp I was clinging to the saddle to keep from falling off the mule.

The night was worse. We were at an elevation of 8,000 feet. The boys did not know how to make my bed, and I was cold, so very cold. The wind swept down the hills through the tent, and all night I lay awake and shivered under a pile of blankets that should have been ample in a North Dakota blizzard.

DEEP CANYONS MAKE TRAVELING HAZARDOUS

The plateau over which we were to travel for the next two months slopes upward from the low plains of the Sudan. It rises gradually higher and higher until the extreme eastern edge is reached.

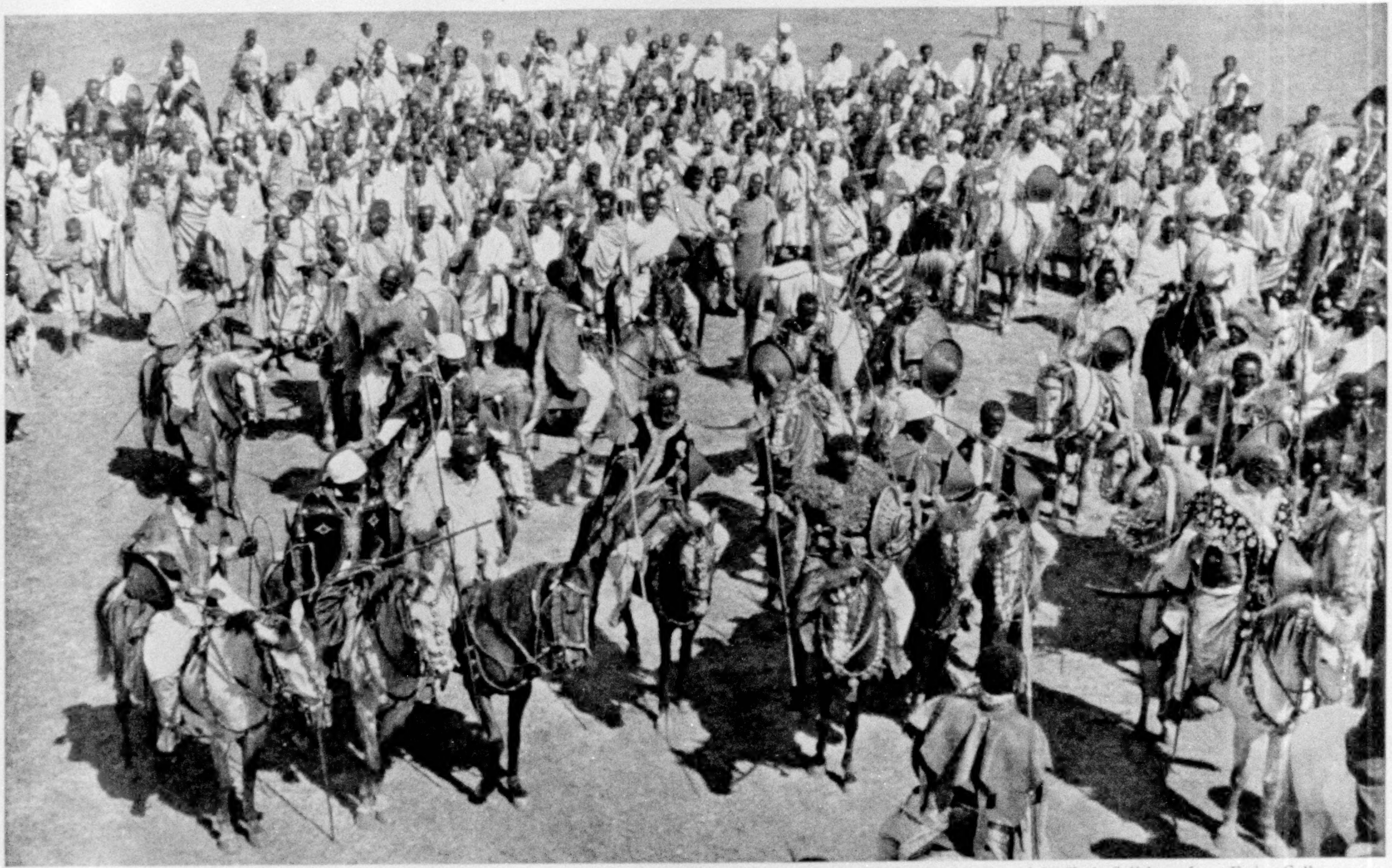
Here it breaks abruptly into a great escarpment, the first drop being one of 5,000 feet. Its surface is cut by streams, the larger of which have eroded canyons of great extent and of forbidding depths. The aspect of the country is extremely



Photograph by E. A. Salisbury from Ewing Galloway

FOUR ABYSSINIAN NOBLES WITH THEIR FOOT SERVANTS AND MOUNTS

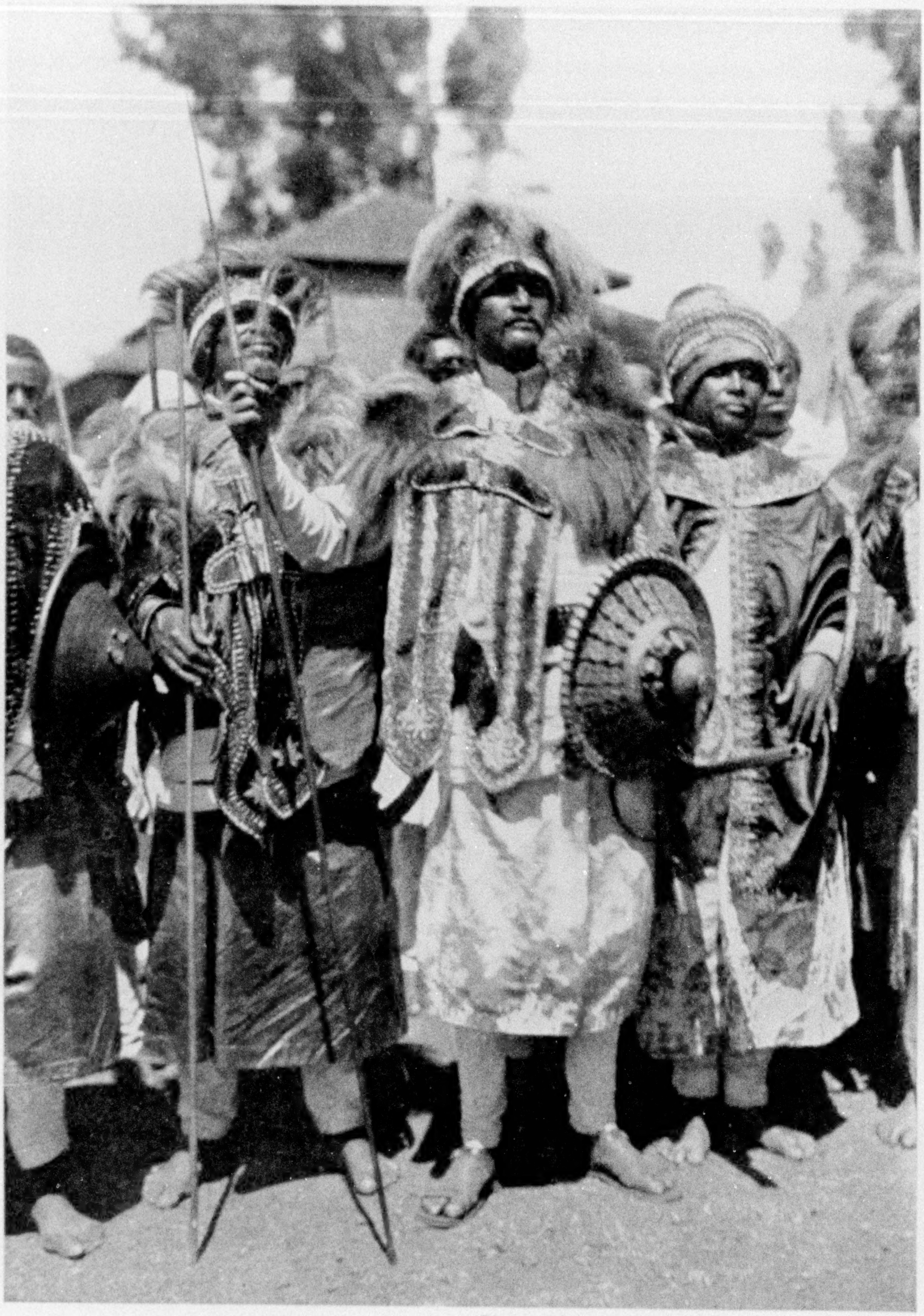
They carry the decorated leather shields of chieftains and wear collars of lions' manes.



Photograph by E. A. Salisbury from Ewing Galloway

ABYSSINIAN NOBLES AND THEIR FOLLOWERS IN A MILITARY REVIEW (SEE ALSO PAGE 658)

Like feudal armies of old, the army of Ras Taffari is formed largely of Abyssinian nobles and their personal retainers. A number of these nobles are ordered each year to Addis Ababa, so that the capital may have a large force ready constantly to cope with any emergency. Excellent horsemen, they form a colorful, imposing array when brought together for a military review.



Photograph by E. A. Salisbury from Ewing Galloway

DIGNITARIES OF THE PRINCE REGENT'S STAFF

Two wear the historical lion's mane collar and headdress. The shield is ornamented with silver and silver-gilt.

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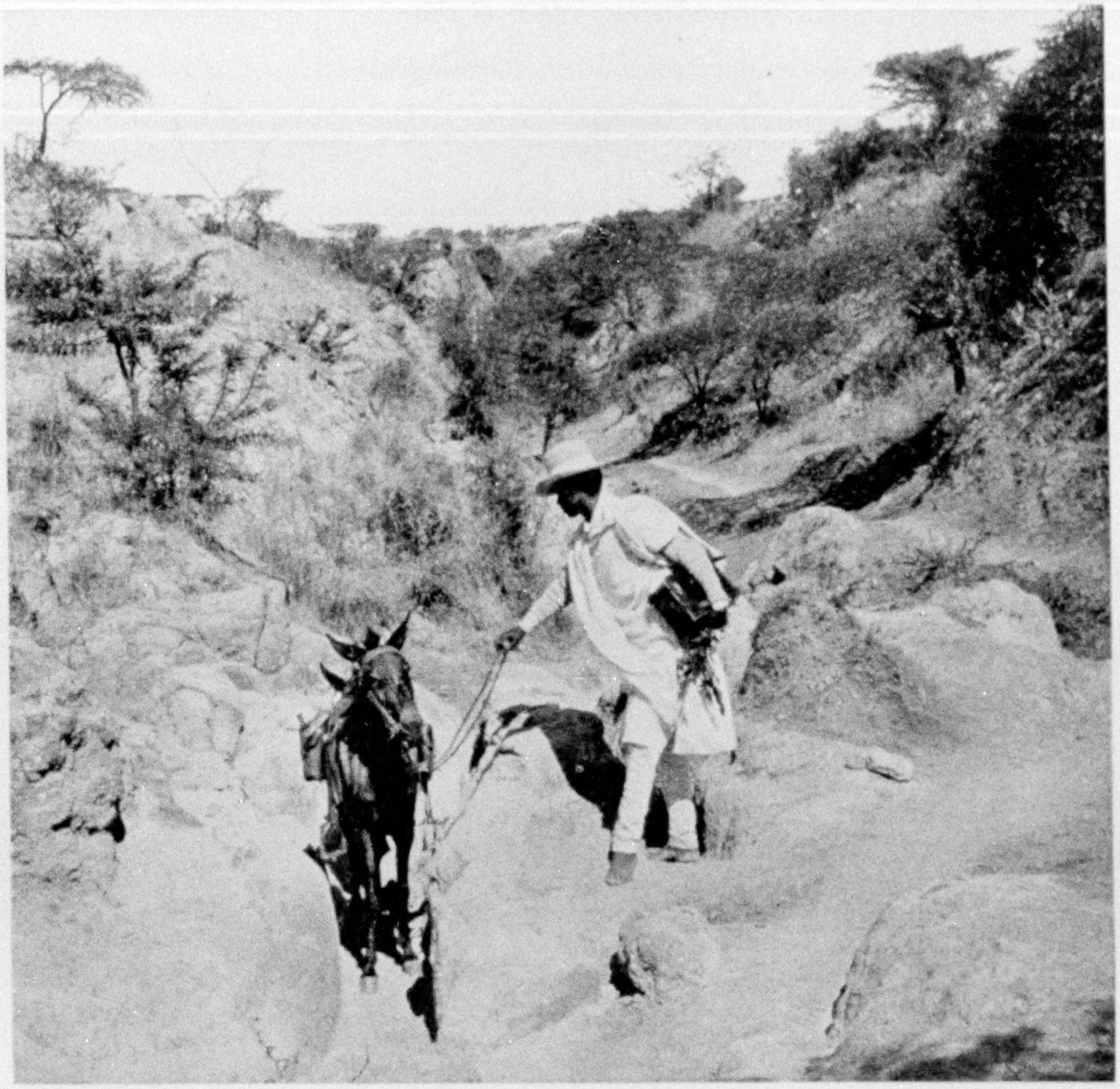


Photograph by Harry V. Harlan

WORN TRAILS LEAD FROM DIRE DAWA TO ADDIS ABABA (SEE MAP, PAGE 618)

mountainous, but for the most part this appearance is due to erosion.

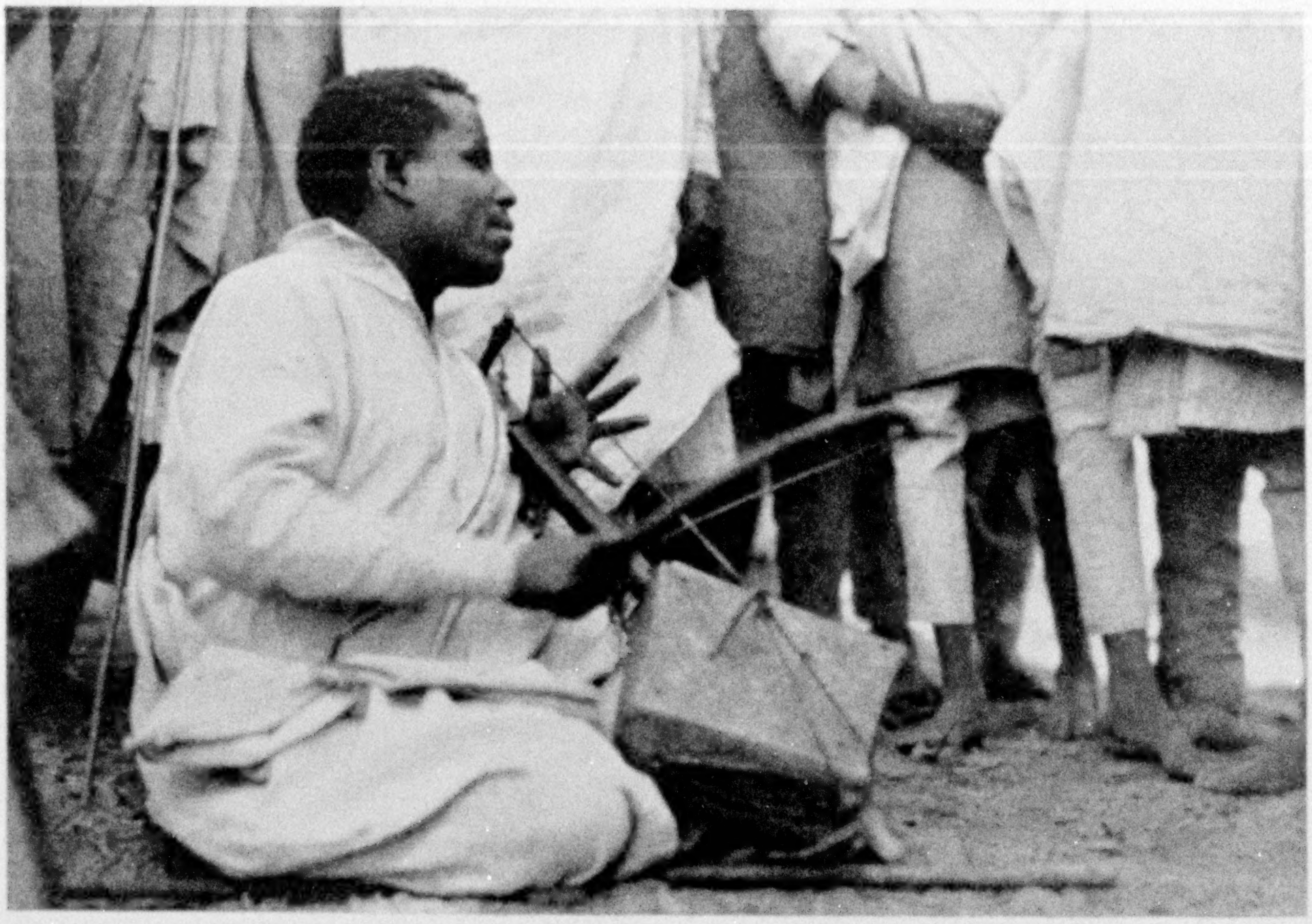
The canyons interpose great difficulties in traveling. They necessitate either very hazardous descents and climbs or time-taking detours of many miles. The trails, as far as possible, follow the high ground.

At the greater elevations there are often comparatively level areas over which caravans wander with ease. In such places marches can be made with little hardship to the mules.

The villages on the higher plateau are often tucked away in the small canyons, which protect them from the fierce wind that blows over the eastern escarpment toward the Sahara. Many of these settlements are very picturesque, with their grass-thatched huts clustered in little shelves of the valley and often surrounded by scattered wormwood trees. There is always the great bare plateau above and the rough, mountainous canyon downstream.

The second night we camped beside a group of lakes so covered with ducks, geese, and cranes that the air was constantly filled with their cries. The geese, which are not eaten by the Abyssinians, were almost tame enough to kill with a stick.

The first few days we rode over high plateaus, passing many fields of barley, wheat, and broad beans. The grains were ripening and one could not but be amazed at the uniformly vigorous appearance of the plants. The barley fields were as heavy with grain as those of southeastern



Photograph by E. A. Salisbury from Ewing Galloway

A BLIND ABYSSINIAN BEGGAR PLAYING ON HIS ONE-STRINGED INSTRUMENT

Minnesota or the bay region of California, yet the methods of culture are very primitive.

Beyond Ankober we saw the plowing for a new crop. The ground was being scratched by hundreds of narrow wooden plows pulled by light oxen. All drivers of oxen seem obsessed with the idea that cattle are deaf, and shout at them continually. Here, due to the joint frantic efforts of drivers and plowmen, the ground was stirred for a depth of three inches.

"GIVE ME A PAIR OF PANTS!"

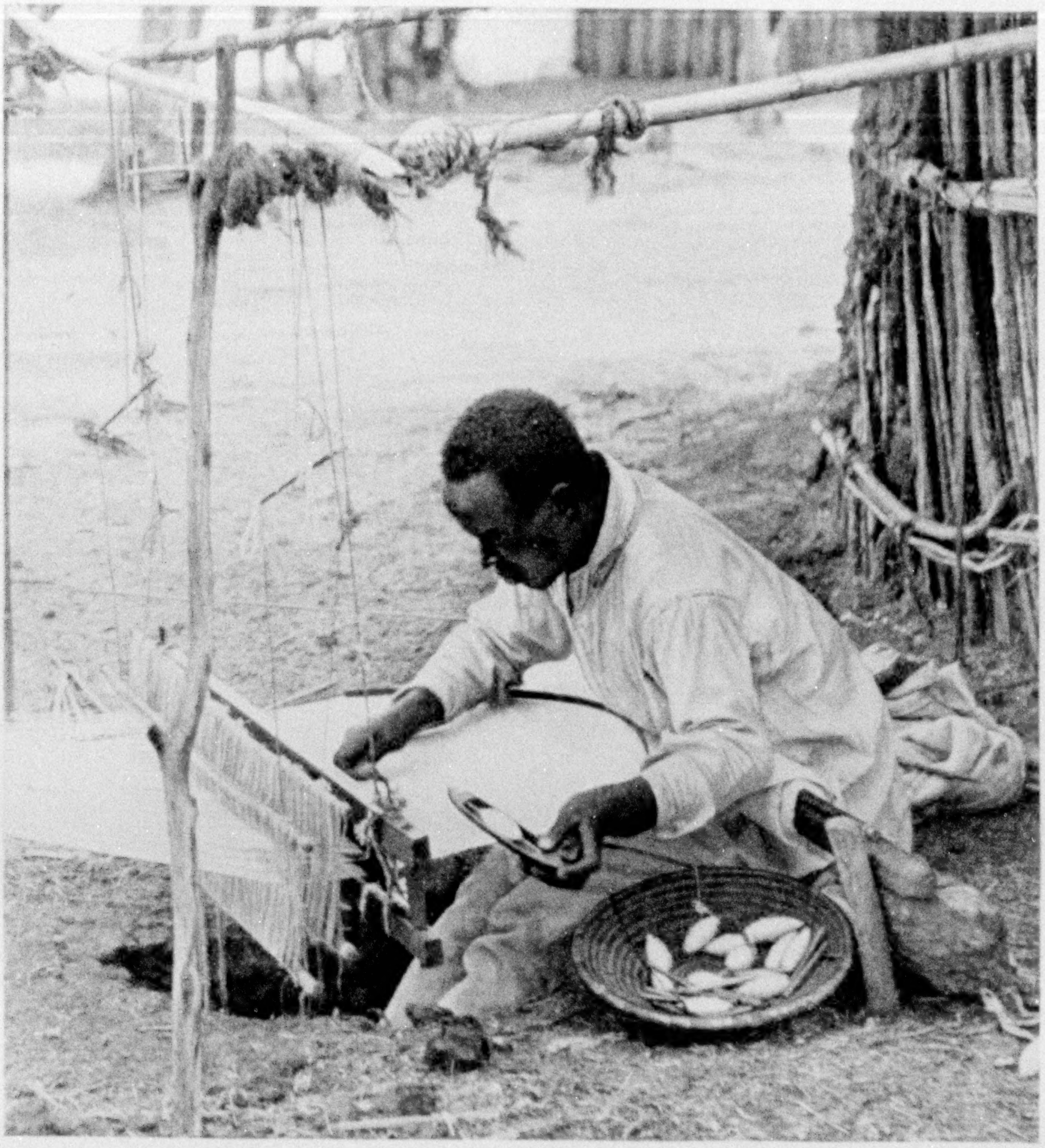
The fifth day from Addis Ababa we rode through rain at an elevation of from 9,000 to 10,000 feet. It was bitter cold, but I had recovered so far that I was not affected, and wandered away from camp to take pictures as soon as we had pitched our tents.

I had been cautioned by both Europeans and natives not to stray from the caravan on the march or from camp. I followed this advice at first, but it is difficult to maintain an attitude of caution. Besides, this day was cloudy and I knew I would have few such opportunities to get away from the shadows in my photographs. To take several unusual views, I followed a side trail leading into a small canyon. Farther down I saw wild roses in seed, which I gathered; then wandered on and on.

Suddenly it was recalled to me that I was not supposed to be out without a guard. I met an old man coming up the trail. Half a dozen young men with rifles were just offside among the rocks. The old man planted himself squarely in the path and jabbered something in Amharic. I called to my camera boy who was 20 yards behind. When he came up I said, "Kassaye, will you find out what this man wants?" Kassaye spoke to him, and again he jabbered. "He says, 'For Heaven's sake, give me a pair of pants!'"

My pulse went back to normal, but I had no pants to spare. Indeed, I was uneasy lest his words should be the first I would use upon meeting the British official at Gallabat, 800 miles to the northwest.

The sixth day out from Addis Ababa we rode into Ankober, situated on a peak in the breaks of the eastern escarpment. We sighted it hours before we arrived, but were compelled first to drop down



Photograph by E. A. Salisbury from Ewing Galloway

AN ABYSSINIAN WEAVER AT HIS LOOM

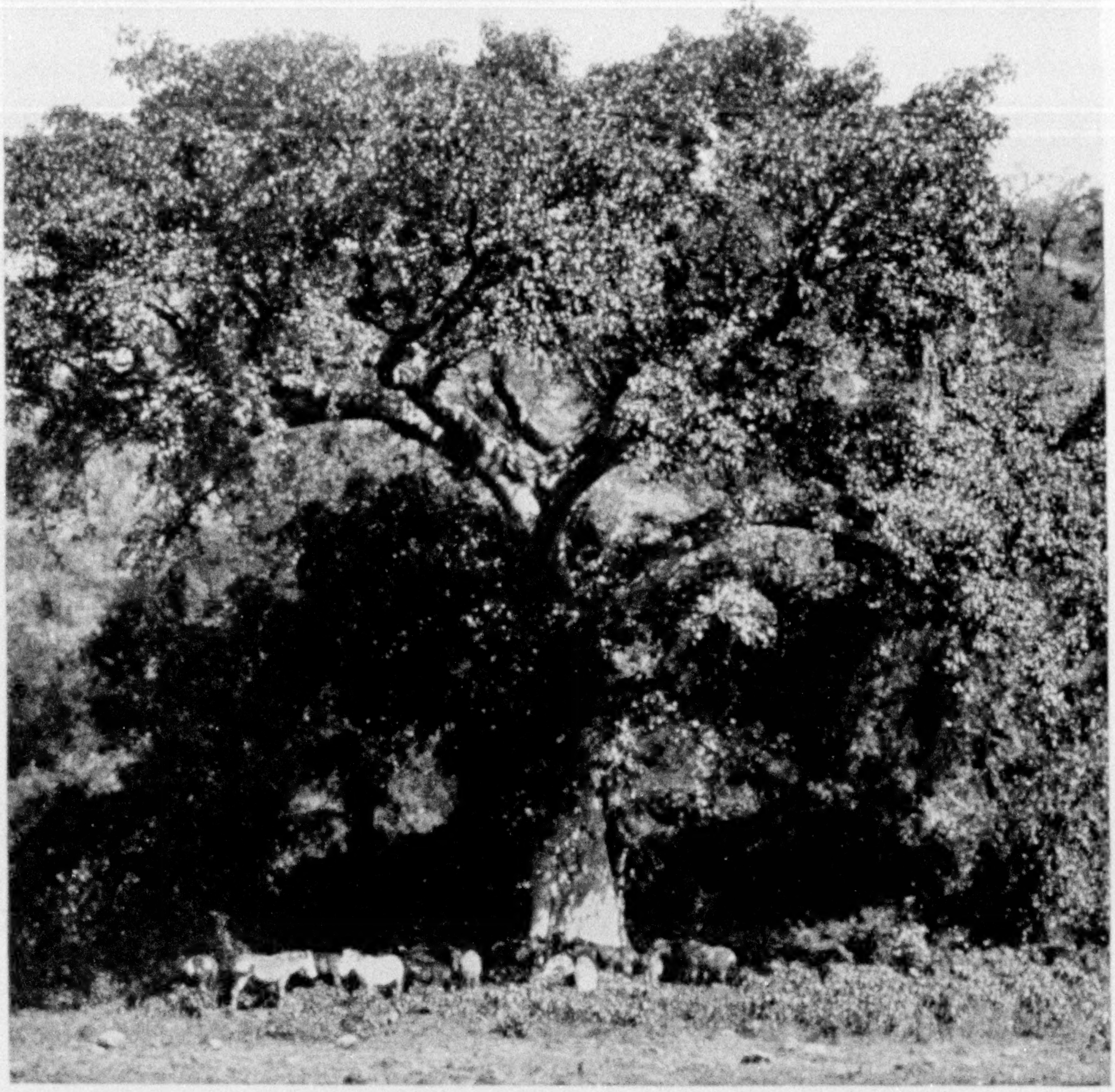
thousands of feet to cross a stream and then reclimb to an almost equal elevation. The sides of the canyon were very precipitous and, although the trail zigzagged back and forth, it was extremely steep.

HISTORIC ANKOBER IS SET ON A HILL

Ankober was founded by Amada Yesus about 1750. It consists of a needlelike peak surmounted by a citadel which includes an inclosure and a couple of houses, one of which belongs to the ruler. There are several lines of defenses of a type perfected as a barrier to spearmen. There are also three or four guardhouses on the path which leads to the crest.

About the hill lie a few scattered huts and on either side is a church.

The view from the peak at the corner of the plateau is magnificent. To the north and west are lines of crags, rocky pinnacles, and forbidding chasms eroded from the escarpment. To the northwest the escarpment rises like a wall. From the southwest to northeast the plain of the Hawash River sweeps in a great curve—miles and miles of blue-black acacia grasslands that fade away in the lower levels to intangible streaks of white.



Photograph by Harry V. Harlan

HORSES AT REST UNDER A FIG TREE

The wild fig tree flourishes in many parts of Abyssinia. Its fruit, however, is dry and sour and is relished only by birds and monkeys. The natives do not enjoy fruits to any extent and take no pains to cultivate them; in fact, near the capital, fruits and vegetables are rarely seen, except in the private gardens of Europeans.

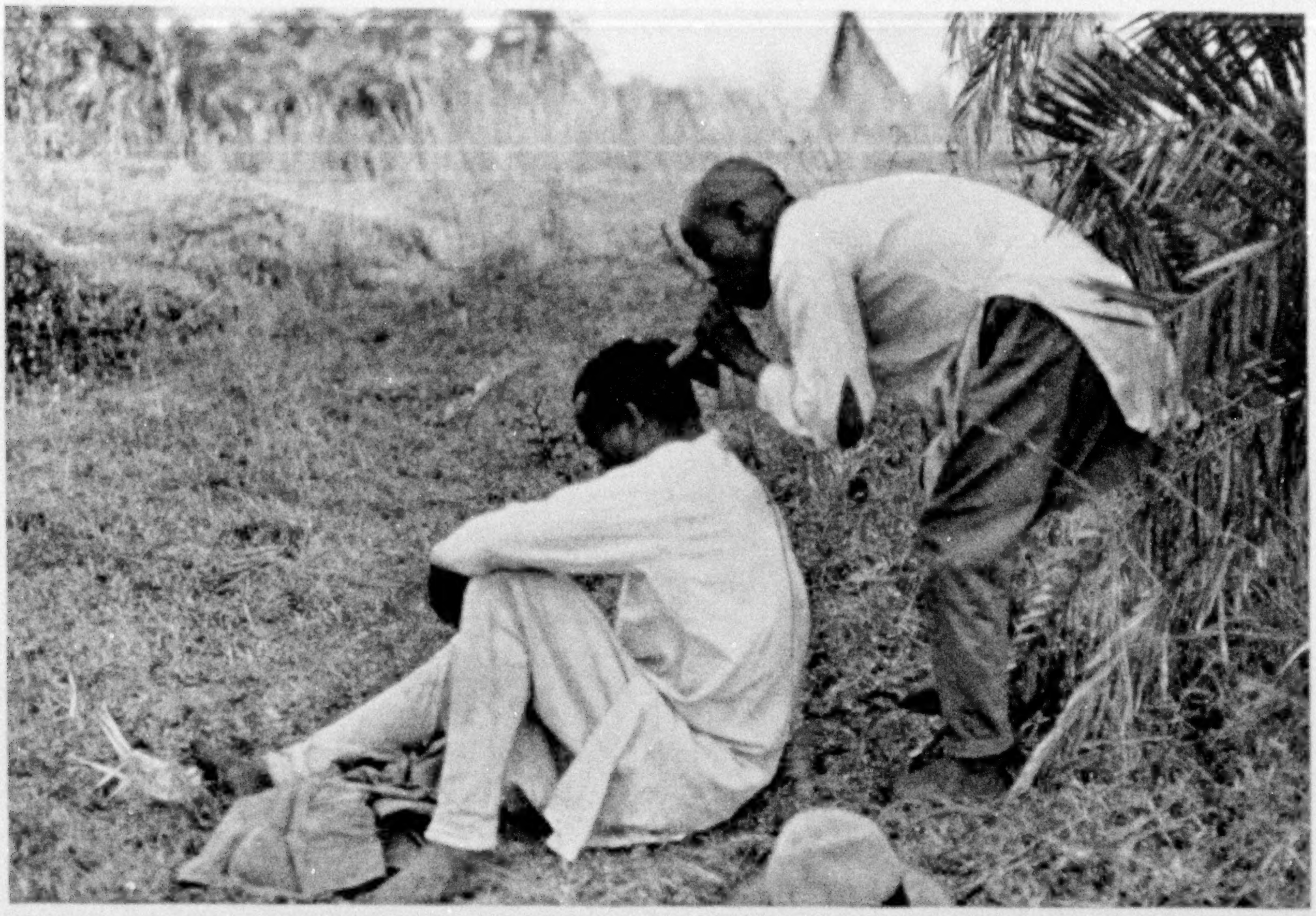
With the field glass toward the hills of Harar we could see the smoke of a train still a day's journey from Addis Ababa.

I visited the two churches at Ankober. The first was quite new, the decorations being unfinished at the time. The typical church building of Abyssinia is circular, but this one was a many-sided affair.

In all churches of this type the central part of the building is occupied by a second circular structure which contains many sacred objects and books. During services the priests perform their ceremonies inside this inner structure. The public is admitted only to the corridor which encircles it. The floor of the corridor is usually covered with a sweet-scented grass, fragrant even when dried.

This building doubtless superseded a more ancient one, as two kings were buried within a few yards of it.

The second church, on the other side of Ankober Hill, was one of the most interesting that I found in all Ethiopia. It was probably 80 or 100 years old, circular in form, and decorated in the most gaudy of modern Ethiopian paintings. The outer wall of the inner sanctuary was covered with a multitude of paintings representing Biblical scenes for the most



Photograph by Harry V. Harlan

DRAWING BLOOD TO RELIEVE HEADACHE

The sufferer was a tentman of the author's caravan and the "physician" was the assistant cook.

part, although the artist included Abyssinian history and threw in a few fancies of his own. The colors were the brightest that can be secured from aniline dyes. They were assembled rather than combined, and as a collection of pigments the work was a success.

Besides the Biblical scenes, there were processions of Ethiopian kings, ocean sailboats without apparent purpose, and, in one case, a cannibal sitting before a human body carefully disjointed for the repast. Before the doors leading into the sanctuary were the ceremonial drums. One of these was of silver (see illustration, page 637).

The Amharas belong to the Coptic Church, a branch of the Christian faith. In their services the priests often encircle the church dancing, or dance before it, as was the custom of the Jews in Biblical times.

A very aged priest escorted me through the building, and at the conclusion of the tour I presented a small donation to the church. Then followed a scene which afterwards became familiar to me, but which at that time was quite novel. He stopped me and all the natives near by and offered a long series of prayers for my safe return to my country.

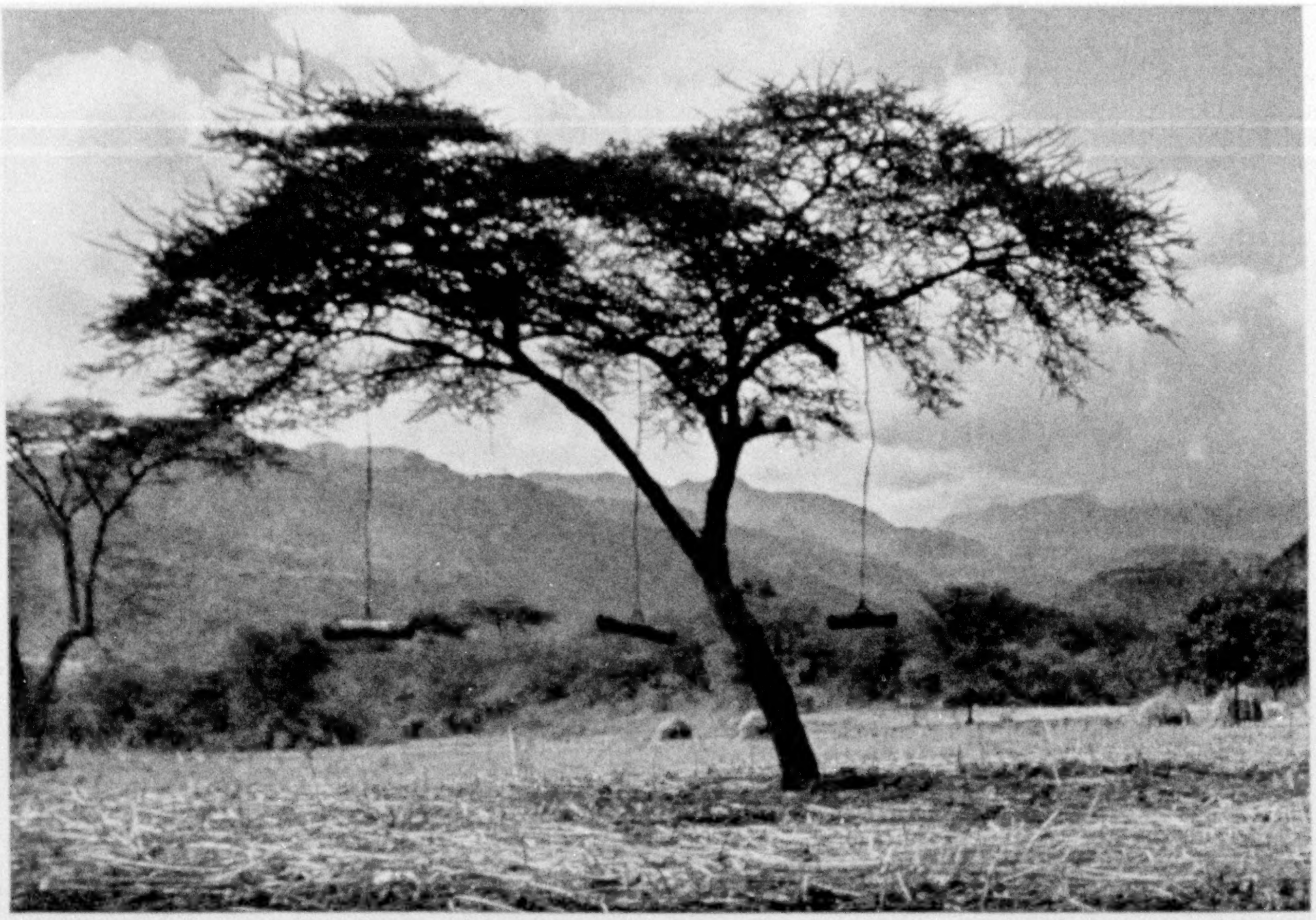
I was shown the sights of Ankober by the man who had been rifle-bearer to King Menelik. He also escorted me along my route for a couple of hours the next day when we left Ankober.

We again dropped down to cross the stream which had made our entry into the city difficult, then climbed 2,000 feet straight up the face of the escarpment.

Three hours after leaving Ankober we were among the barley fields again, with miles of level country before us. Far to the northwest we could see Mount Tabor. We camped at its foot 33 days later. Beyond it lay Lake Tsana. We could also see to our north the high country which lay between us and Dessie, the next important town on our route.

We camped that night at 10,700 feet, according to my barometer, the highest point of the trip. We were again among the ducks and geese.

After three days we changed our course.



Photograph by Harry V. Harlan

BEEHIVES OF DURRA STALKS SUSPENDED FROM A TREE

Honey, found widely over Abyssinia, is the basis of *tej*, the national drink. Long, cylindrical baskets containing a little honey are placed in or suspended from trees. After the bees have built hives in them, the honey is squeezed into goatskins and taken to market. The fermented tej is usually homemade. The wax is one of the few products exported from Abyssinia.

We had now been on the plateau for nine days' travel and were wondering what might be below us, just off the edge of the escarpment. One of our advisers at Addis Ababa suggested we might run down for a day from Dessie. Others thought we had best stay on the plateau. Our caravan leader told us that Menelik's favorite road to the Wollo district dropped off the plateau. We decided to drop, and drop we did—down, down for 14 days.

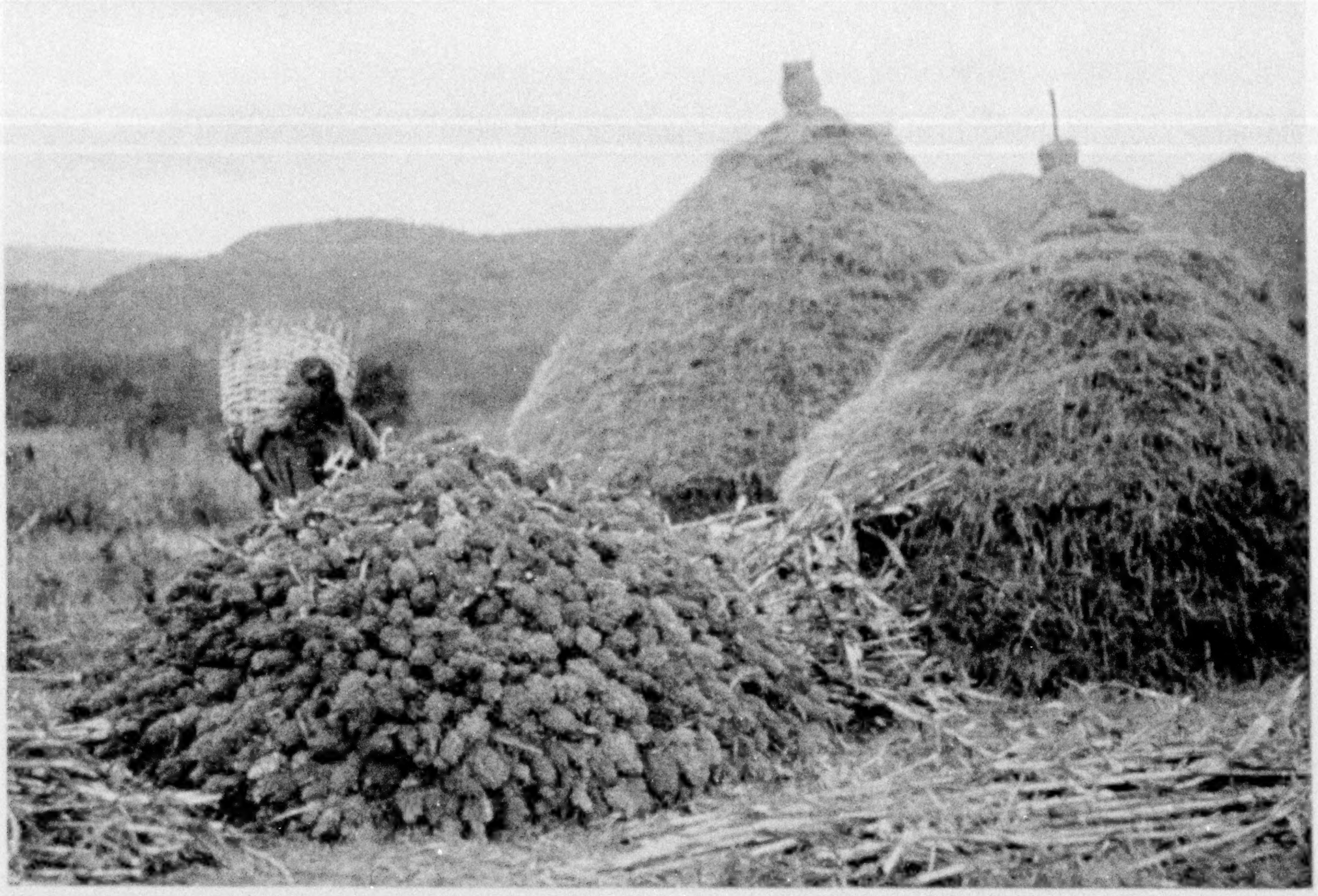
LOYALTY TO RAS TAFFARI CAUSES A COMMOTION

On the way to the edge of the escarpment we were having some difficulty finding the proper roads. A local chieftain had joined us and had ridden with us across the territory over which he ruled. As usual, he had a large retinue with him.

When we reached the limit of his district I asked him to send a guide with us. He agreed with apparent pleasure and, turning, spoke to his followers. In a second he was surrounded by a mob of shouting, protesting, gesticulating men. The chief, a man of 6 feet 3 inches, stood in the center, showing rows of flashing white teeth and shaking his spear until its form was lost in vibrations.

The dispute became so violent that I thought it best to give the natives an opportunity to settle it among themselves. I climbed a near-by hill to photograph a village. When I returned the situation was unchanged, so I got one of the interpreters to explain the trouble. I found that the men were angry because their chief had ordered two of them to accompany me. They wanted to go of their own accord, as a tribute to Ras Taffari, and not because they were ordered to do so! And go they did, 20 of them, taking us all the way to our evening camp site.

For two days we had come across one pack train after another, all going in our direction. They consisted of burros



Photograph by Harry V. Harlan

WOMEN PILING DURRA HEADS BESIDE STACKS OF TEFF

Teff, a kind of millet, is the principal cereal crop of Abyssinia and is found in two varieties, red and white. It is grown in the higher parts of the country. Durra, a grain-yielding sorghum, replaces teff in the lower regions. Abyssinia has a surface of such varying levels, with consequent differences in temperature, that numerous varieties of grain, fruit, and vegetables can be grown. The soil is so fertile that in some sections three and four crops a year can be obtained.

loaded with grain. The drivers, when asked where they were going, invariably answered, "To the Makfud market." I was naturally interested in markets, as they offered an opportunity to collect grains and seeds; also, "Makfud" was one of the names that was on all three of our maps.

We decided to go to Makfud, so sent the caravan directly ahead, while we made the detour to the market. Imagine our surprise, after a three hours' ride, to come out upon a bare mountain top. This was the Makfud market place. There was a large village an hour away, which doubtless was on none of our three maps, yet this place was shown on each of them.

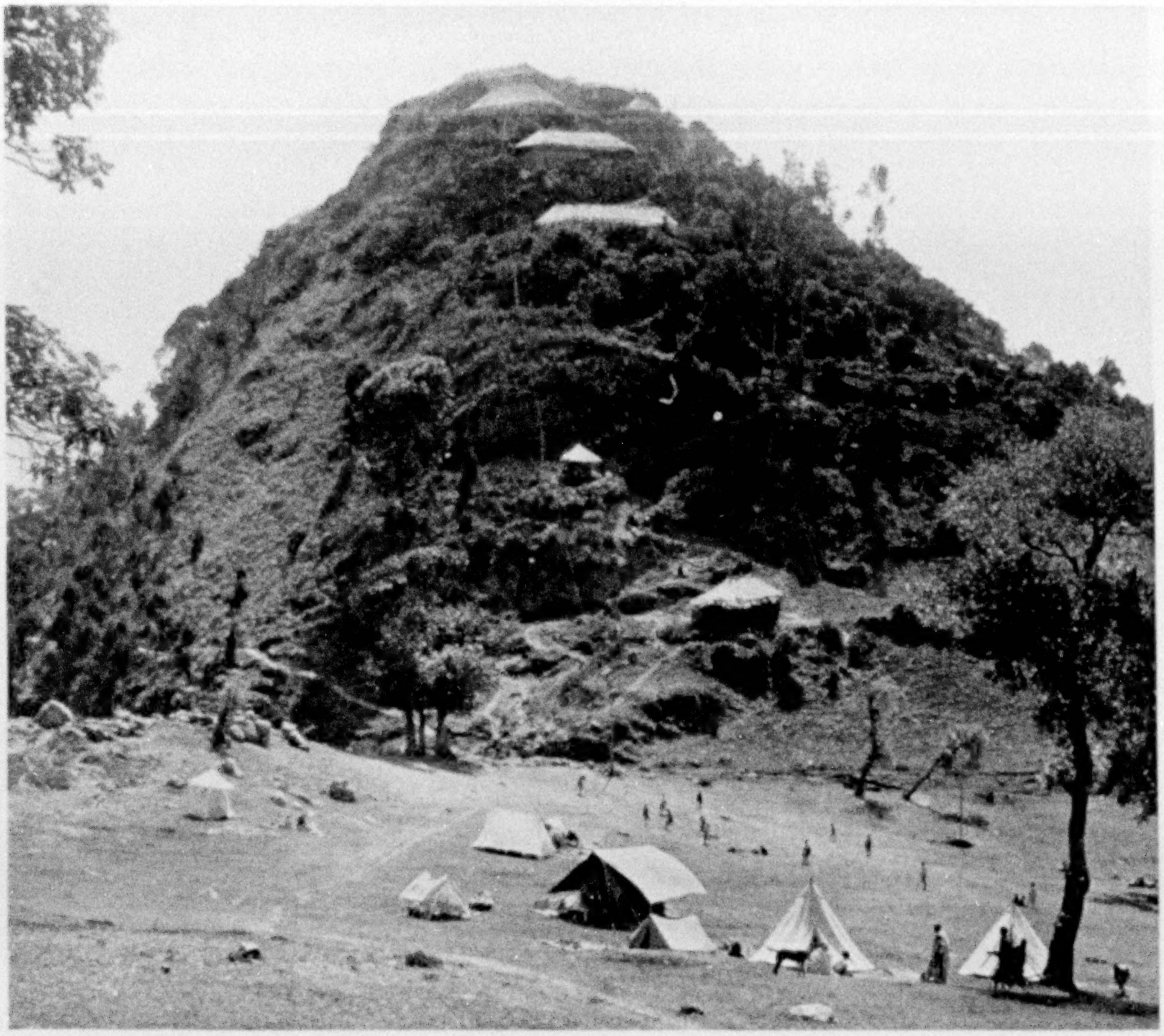
COTTON AND SALT USED AS MONEY

I came across other markets later—bare mountain tops like this one, with no village about.

We were very glad we came, however, for this was a point to which the people of the lowlands climb one day each week to exchange cotton and other tropical products for the grain of those who descend from the plateau.

Here I first ran into the complications of Abyssinian money. About Addis Ababa and along the railroad, traffic is carried on much as elsewhere in the world. Over most of Abyssinia this is not true, however. The old Maria Theresa thaler of Austria I found good everywhere, with reservations. It is as good in Gondar as in Addis Ababa. But the coin must be dated 1780 and the medallion on the empress' dress must not be worn off by usage. No date other than 1780 is acceptable. All new coins bear this date.

With the fractional currency it is different. The thaler is divided into 16 fractions, usually called *tomauns*. These are accepted in and near Addis Ababa. It is true that one cannot get 16 of them, except in stamps at the post office. In



Photograph by Harry V. Harlan

THE HISTORIC ABYSSINIAN CAPITAL OF ANKOBER

It consists of a needlelike peak crowned by a citadel (see text, page 631). Several guard-houses are scattered along the path to the summit. In the foreground are the tents of the author's caravan.

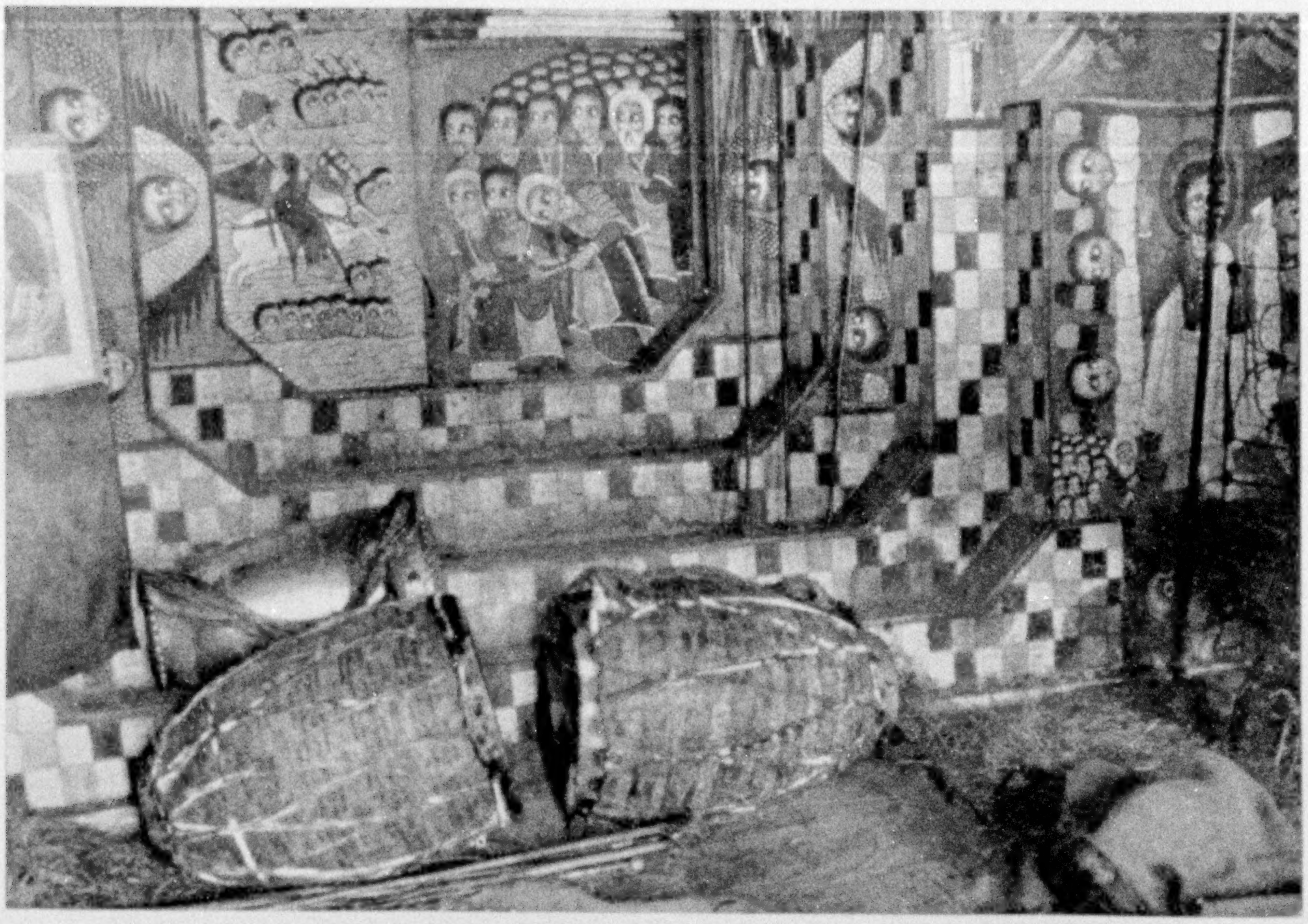
the market you get 11 or you may get 8, depending on their scarcity, but never 16. Beyond Ankober they are not accepted.

At the Makfud market I selected 12 samples of grain and sacked them. They weighed only a couple of ounces each, and when I offered one tomaun each I was offering a great many times their value. My offer was refused. The owners wanted cotton, that being the medium of exchange here.

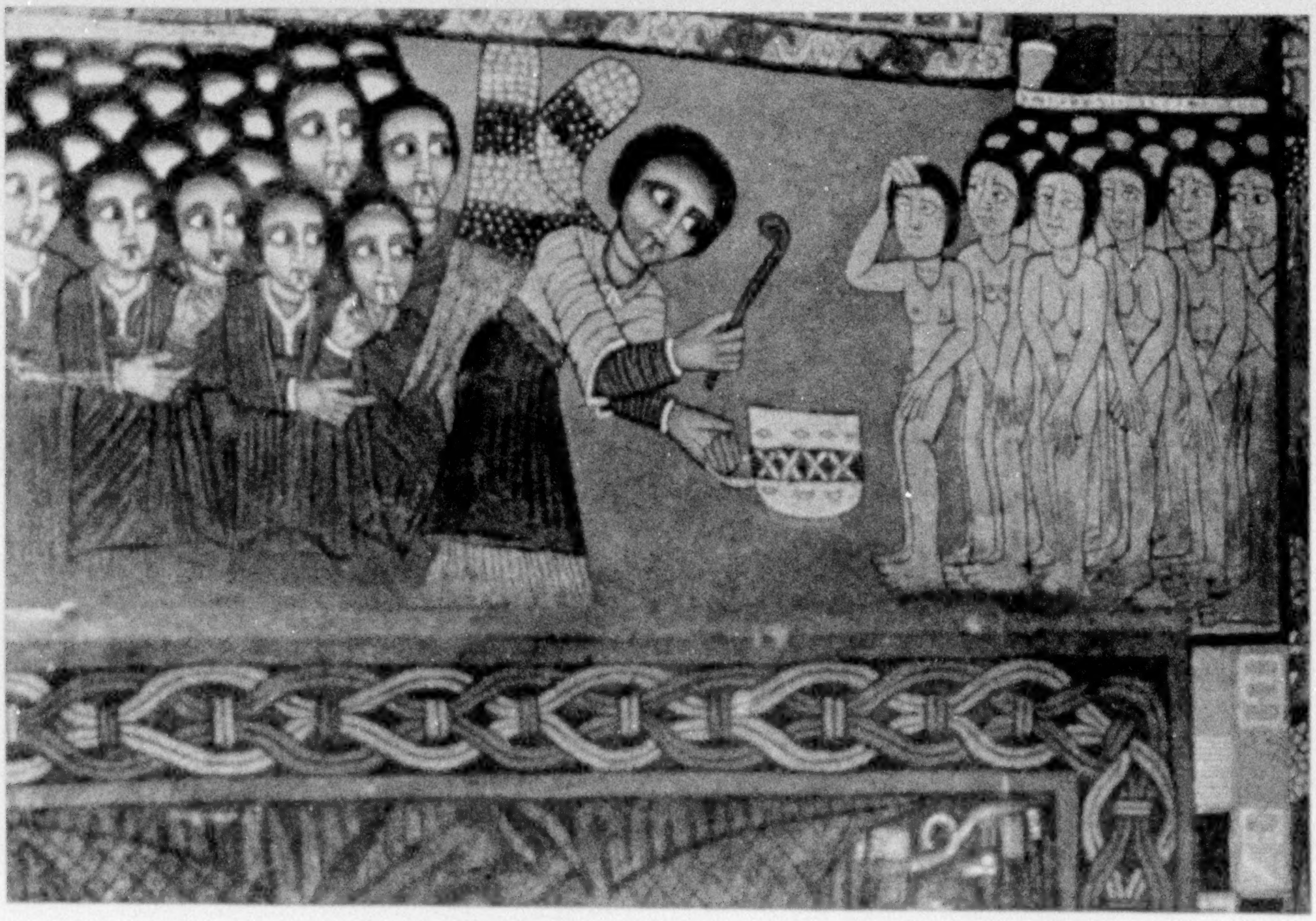
I saw a native merchant from Addis Ababa buying cotton. I knew he would take tomauns, so I purchased from him one tomaun's worth of cotton and with that cotton purchased my 12 samples. Strange to say, those of whom I had purchased grain did not resent my offering them in cotton the twelfth part of my first offer, but seemed, on the contrary, quite pleased.

Farther north we used salt for minor payments. Four bars of native salt are sold for one thaler. If a chicken is purchased, a chunk of salt the size of an egg is knocked off and presented for payment.

After leaving the Robi River valley to the north of Makfud, our road ran through a series of small valleys of which I had not heard and which were marked on none of our maps. The lower ends were occupied by salt-water marshes, while their upper ends were planted to almost continuous fields of grain sorghums. These sorghums were much taller than the Kafir corns and durras introduced into America years ago, and



CEREMONIAL CHURCH DRUMS: ANKOBER

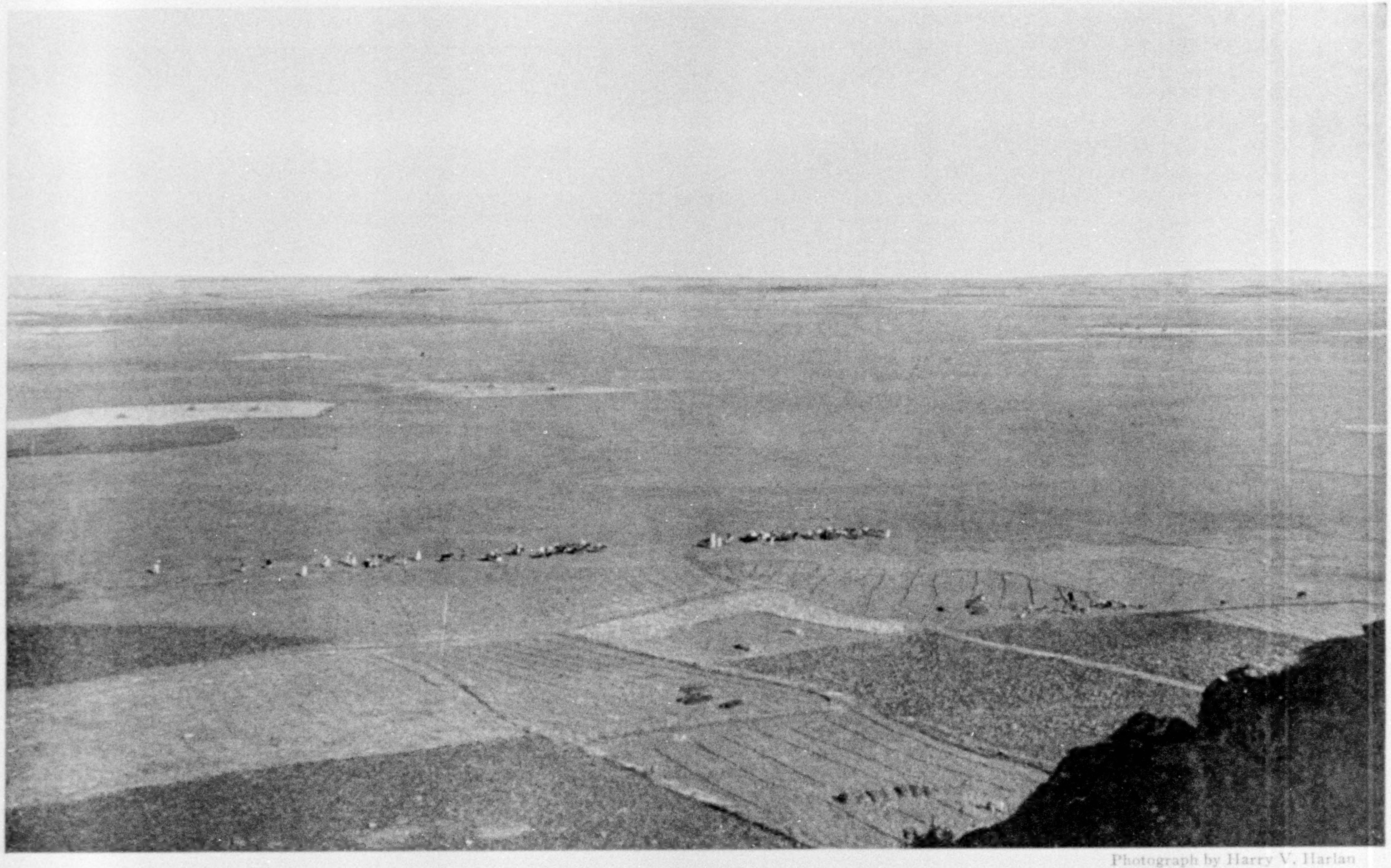


Photographs by Harry V. Harlan

A FRESCO IN A CHRISTIAN CHURCH AT ANKOBER

In the center is an angel, to the reader's left are the saved souls, and to the right are the lost. The colors of the mural decorations in the two churches at Ankober are as gaudy as aniline dyes can make them. Virtuous people are always represented as looking modestly from the corners of their eyes.

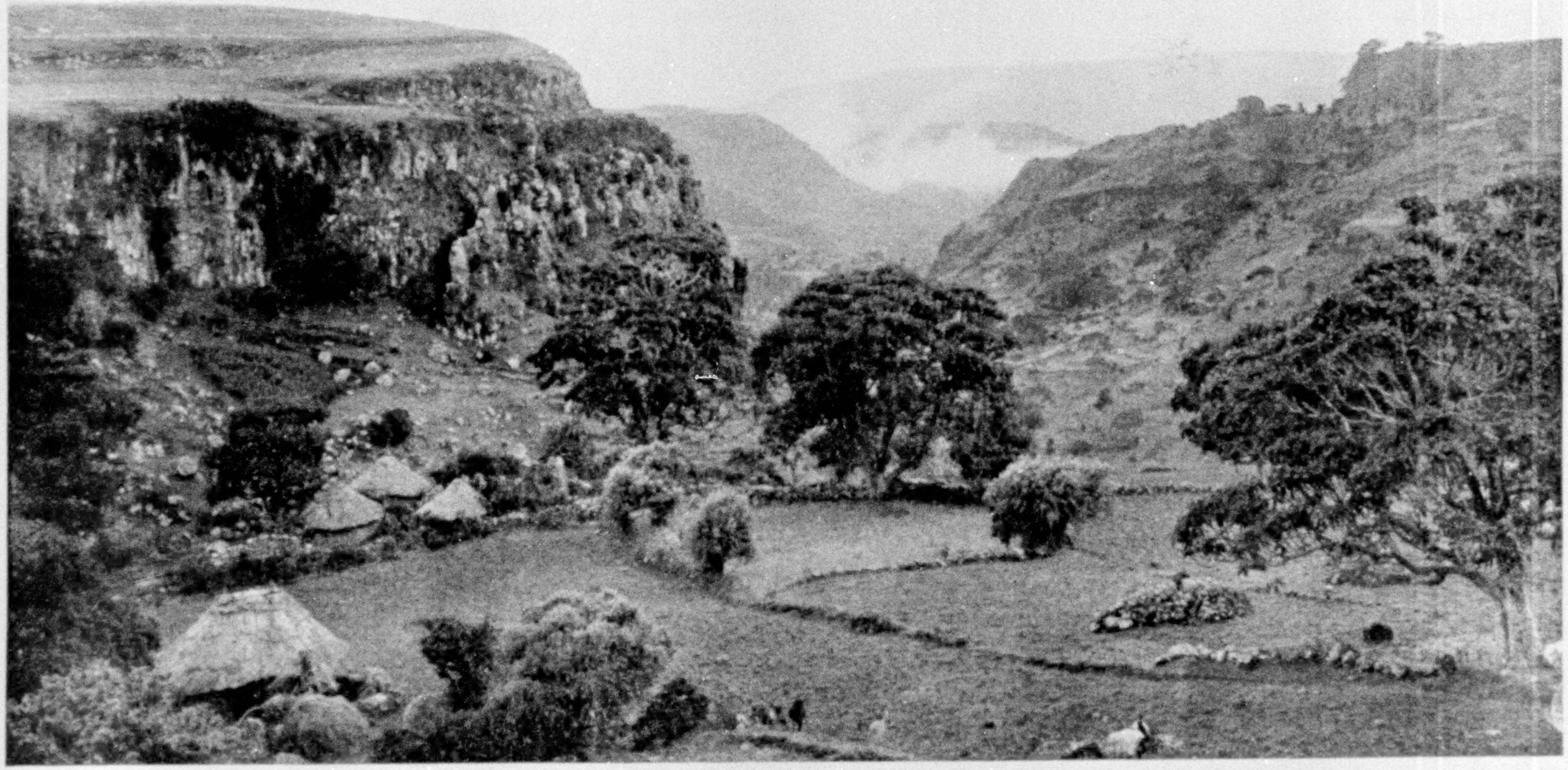
XUM



Photograph by Harry V. Harlan

THE AUTHOR'S CARAVAN PASSING ALONG THE HIGH PLATEAU

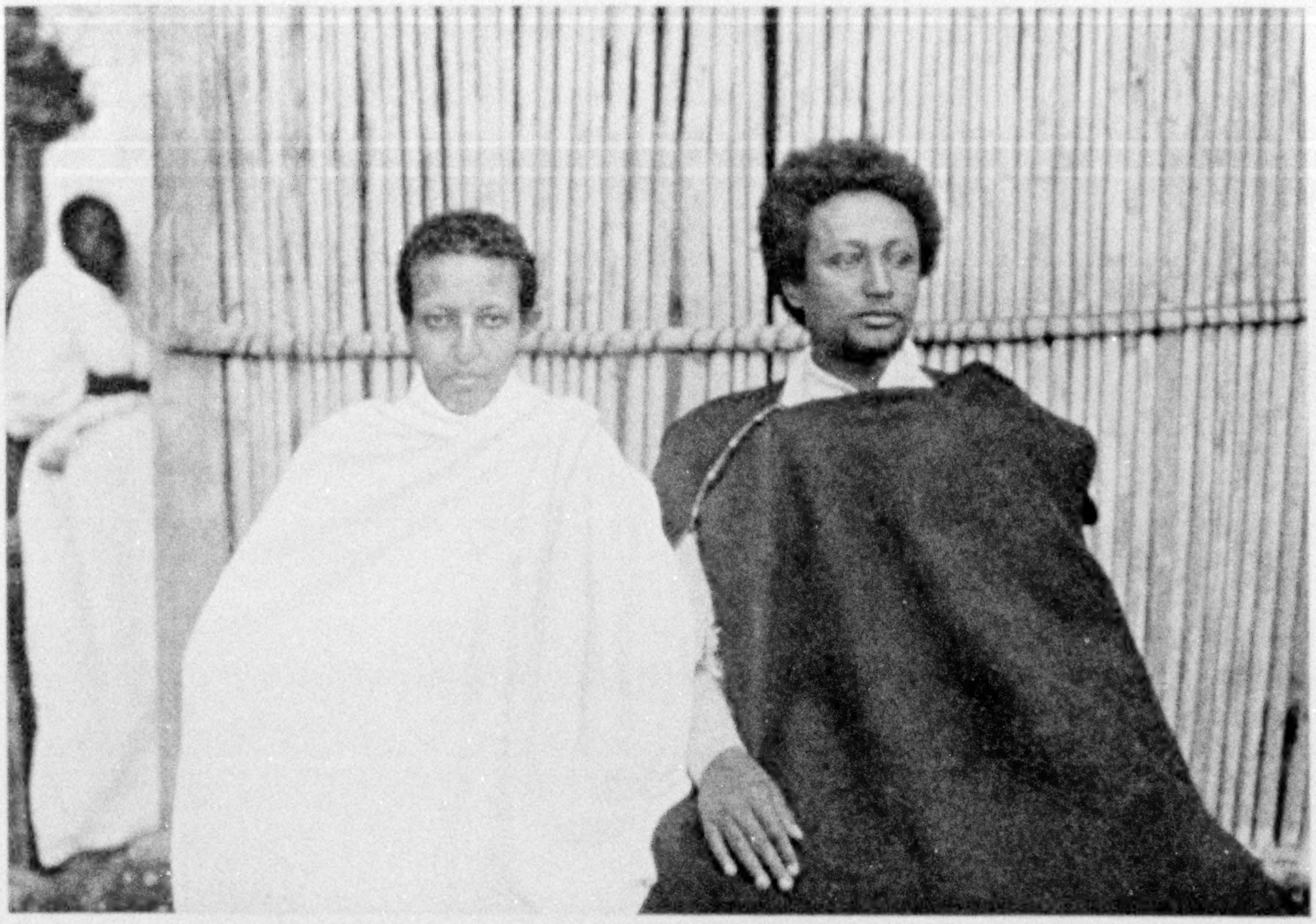
For two months the two Americans and their retinue traveled over a high plateau from Addis Ababa to Gallabat, in the Anglo-Egyptian Sudan. The caravan consisted of about 40 men, soldiers, and servants of servants, with some 35 or 40 mules. Many fields of barley, wheat, and broad beans were passed, the plants being uniformly vigorous in appearance. The object of the trip was to obtain primitive wheats, barleys, and other grains for introduction into the United States.



Photograph by Harry V. Harlan

A CANYON ON THE HIGH PLATEAU OF ABYSSINIA

Streams have cut the surface of the plateau and in certain places have eroded canyons of great extent and forbidding depths, which make traveling difficult. The trails follow the high ground where possible, but canyons frequently necessitate hazardous descents and climbs, or time-consuming detours several miles in length. Many picturesque villages of grass-thatched huts nestle in the small canyons to escape the fierce wind blowing over the eastern escarpment toward the Sahara. Scattered wormwood trees often surround the villages.



Photograph by Harry V. Harlan

RAS AURI AND HIS WIFE: DESSIE

The youthful aide to the chieftain of the Amhara district is an intelligent, capable man. He invited the two Americans to his home to meet his wife. Her interesting conversation and bearing toward her guests and retainers showed that the position of the wife in Amhara is one of greater liberty than is customary in the Orient (see text, pages 646-647).

which are now cultivated so extensively in Kansas and Oklahoma. The average height in many fields was in the neighborhood of 18 feet. The soil in those valleys was among the best I saw in all Abyssinia.

THE EXUBERANT GALLA WORKS WITH WILD ENTHUSIASM

One day we came upon a group of Gallas threshing teff. They could be heard for at least two miles from the threshing floor. Half a dozen men were flailing frantically as they shouted a sort of song with frequent musical climaxes. As these were reached, the flails descended faster and faster, and the men beat harder and harder, bending to the ground as they slammed the heavy flails into the straw.

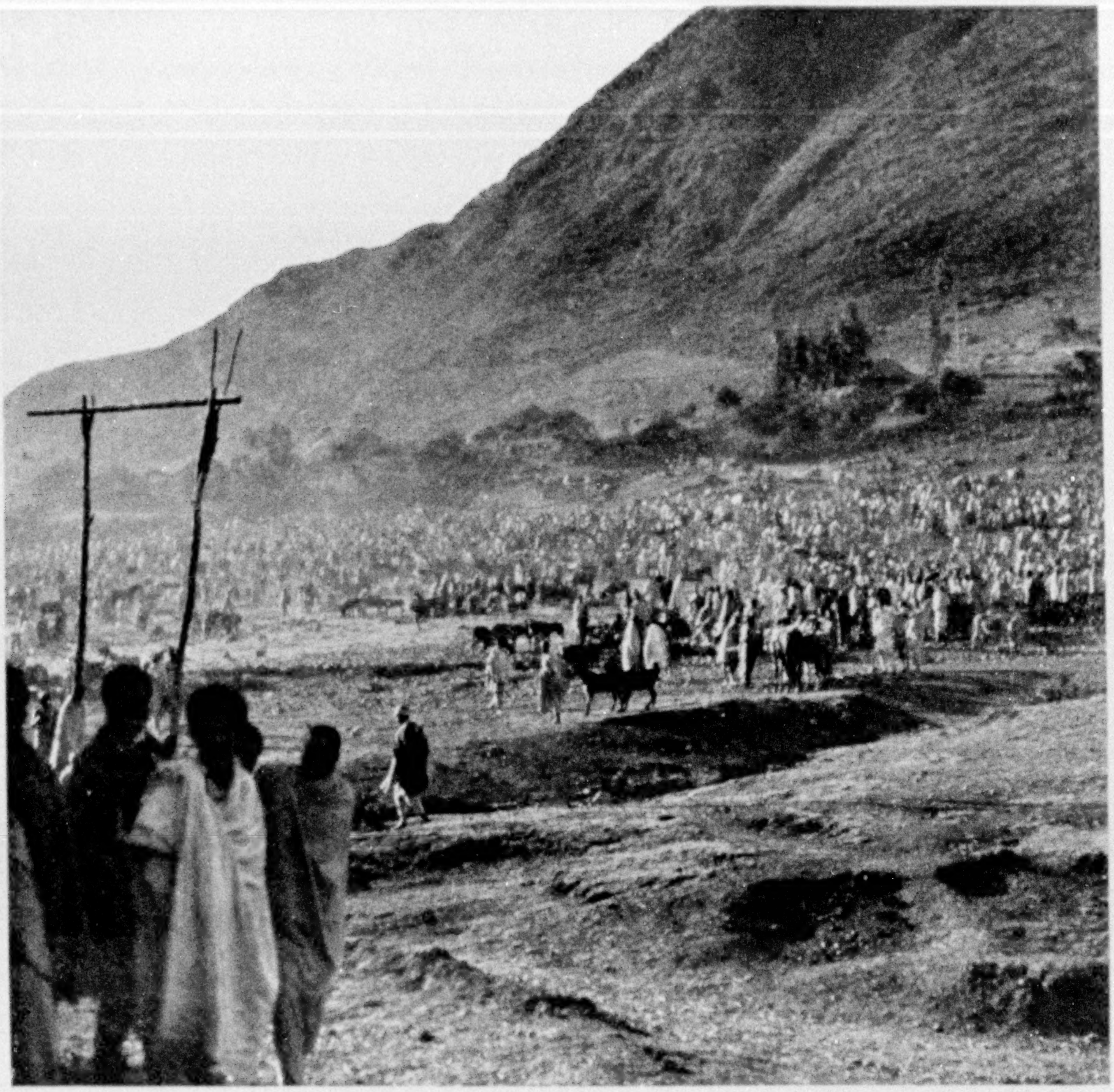
They seem to carry on all operations with the same wild enthusiasm. Near Modjo a month earlier we saw a troop of horsemen riding over a hill toward us. They were whipping their horses to a wild gallop, riding in complicated circles as they advanced, each waving his spear with alarming ease. It was a mounted wedding party, composed of the bridegroom's friends, who were accompanying him as he returned to his village with his bride.

The bridegroom, a man of 40, held the girl before him on his horse. From her size we judged that she was scarcely more than a child, though we could see only her form, as she was completely covered by a filthy square of cotton cloth.

On a distant hillside could be seen the friends and relatives of the bride, who had followed the mounted party from her village to the trail which led to the settlement in which the husband lived.

WARNINGS OF DANGER AHEAD HAVE ANTICLIMAX

As we journeyed to the north we found the Amhara villages withdrawn to the foot of the escarpment and those of the Gallas to a minor ridge, the valleys between becoming a sort of "No Man's Land." Amharas from the plateau de-



Photograph by Harry V. Harlan

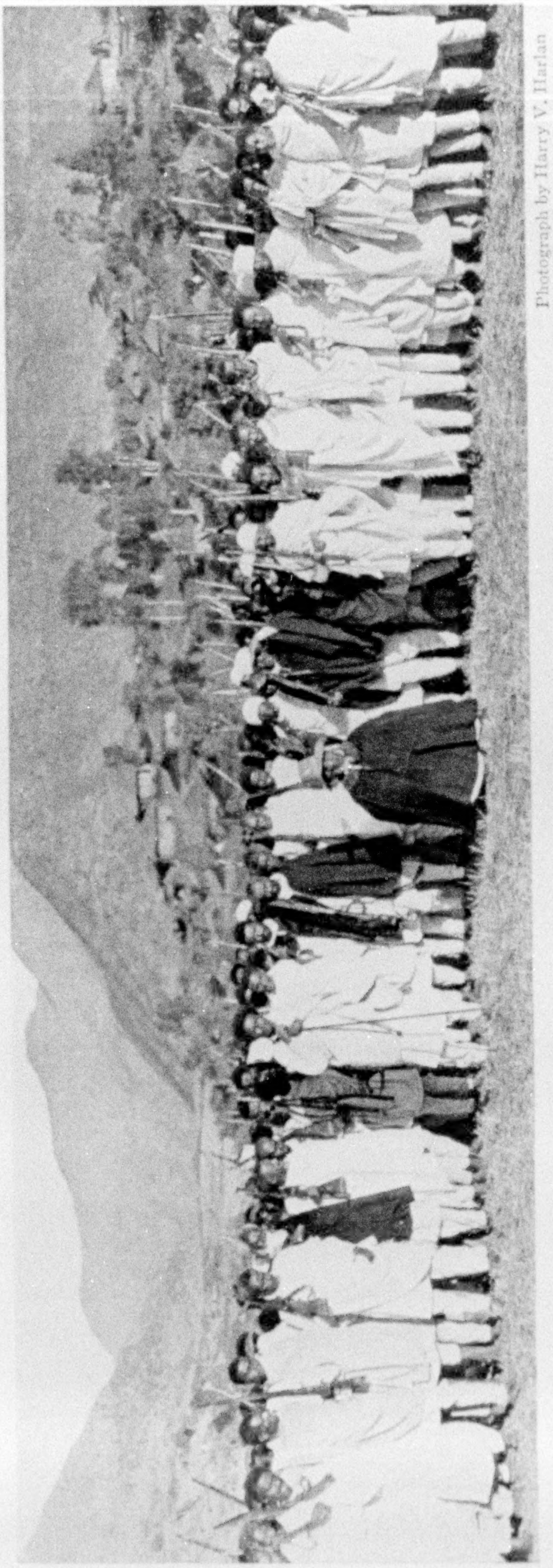
THE GALLOWS IN THE MARKET PLACE AT DESSIE

Abyssinia's penal code is based on the Mosaic Law and its punishments are drastic. Hangings occur frequently, usually on trees or gallows, in a market place. The victim is made to die gradually and his body is left suspended for a few days as a warning.

scended during the day to plant sorghum, and Gallas from the ridge to herd cattle or, perhaps, plant a little. At places, the old war of the cattleman against the cultivator was in full swing, as it was once in our own West. At night the valleys were the scenes of thieving parties, and blame for any depredations was laid by the Amharas at the door of the Gallas, and by the Gallas at the door of the Amharas.

We received many warnings of trouble ahead. We first met a lone man on foot who claimed that he had been set upon by an armed band of 80 robbers; that his mulemen had been killed and his caravan stolen. We then met the remains of a caravan which, according to its owner, had had a similar experience. Our own men were obviously worried.

On December 19 we camped before Majetie, in a valley three hours from the town. The chief sent word that we must come up near the village; otherwise we would be attacked before morning. Farmers working near our camp-site told us the same, but since we marched only six hours a day and Majetie was three hours off the road, there seemed no advantage in camping in the danger zone on the 20th instead of the 19th. We decided to remain where we were.



Photograph by Harry V. Harlan

THE CHIEF OF YEDJO AND HIS ESCORT

Dejasmatch Altimariam is a merry old man and rules a prosperous district having a well-balanced agriculture. He paraded a detachment of his soldiers in honor of the author and adopted the second American of the party as his son (see text, page 651).

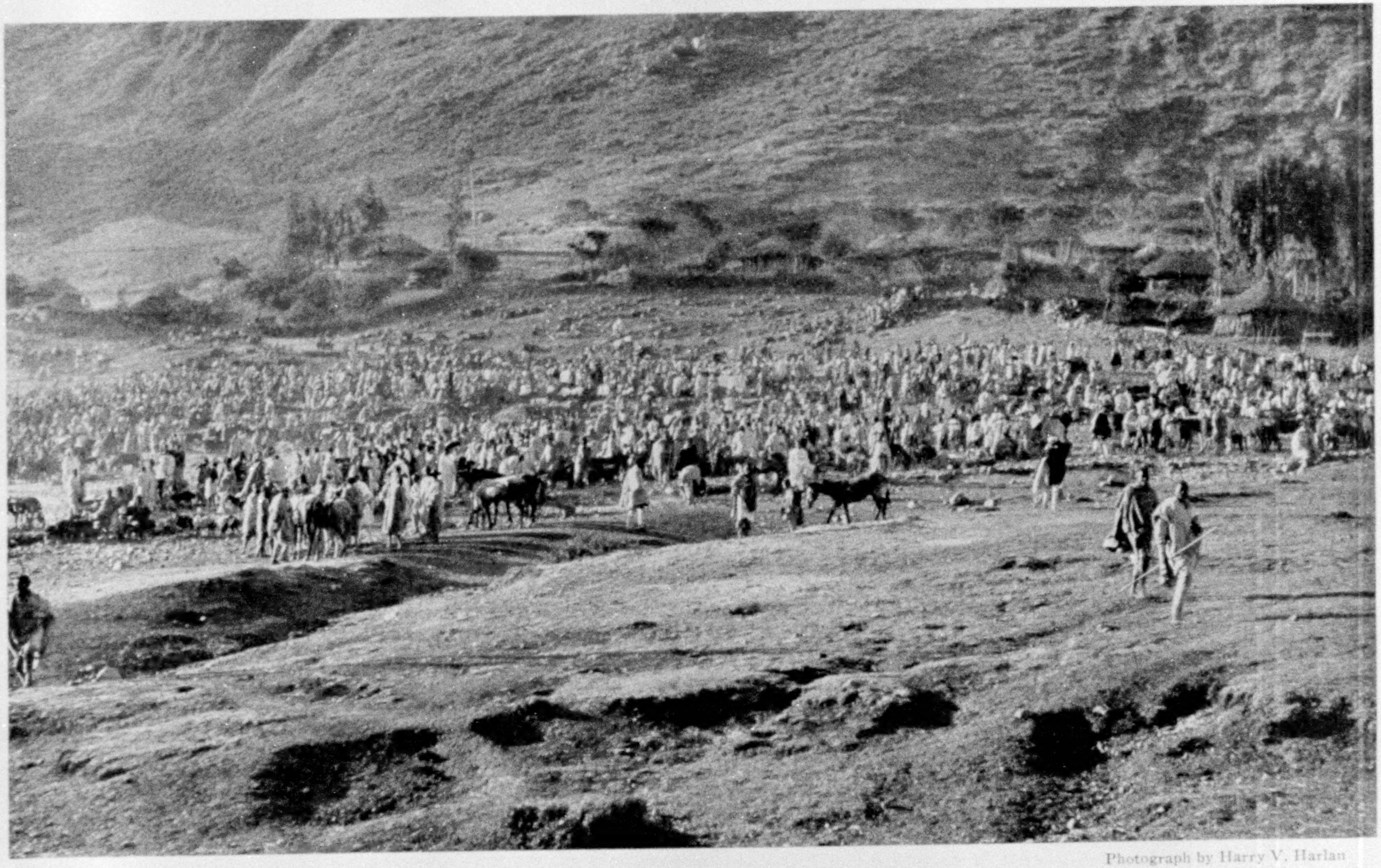
I was not uneasy; I was scared. I do not think my men were any braver, for none of them slept that night. The whole camp was on guard.

Before going to bed I thought it best to look to my defenses. Ras Taffari had sent Ato Belatcho with me as a contact man and chief of the guards, who were changed at the headquarters of each local chieftain.

Ten men had been sent out with me from Ankober. I found that of the ten, only three had had cartridges when they left Ankober, and one of the three had sold his the day before, probably to a bandit. Of the two remaining soldiers, one had two and the other five cartridges. I went to bed with my clothes on and a shotgun with five rounds of buckshot on the covers.

Nothing happened. The anticlimax was typical of the perils of travel in remote regions. Our dangers were largely psychological, and the real difficulties, due to unrest in the region, were avoided by careful organization and contacts effected before the expedition left Addis Ababa.

The next morning when we broke camp there were many Abyssinians about. I noticed one unusually vigorous man armed with a rifle standing within a few feet of me. I thought of him only for the moment, because the occurrences of this morning were not different from those of any other morning. Always the Abyssinians from near-by points came in to see us break camp and they invariably carried arms.



Photograph by Harry V. Harlan

THE MARKET PLACE AT DESSIE: AMHARA DISTRICT

Amhara, the northwest quarter of Ethiopia, is Abyssinia's historic region and is inhabited by Amharas, a Hamitic-Semitic people who are the real Abyssinians, properly so called. They constitute about one-third of the population and are the ruling race, a virile and warlike stock.

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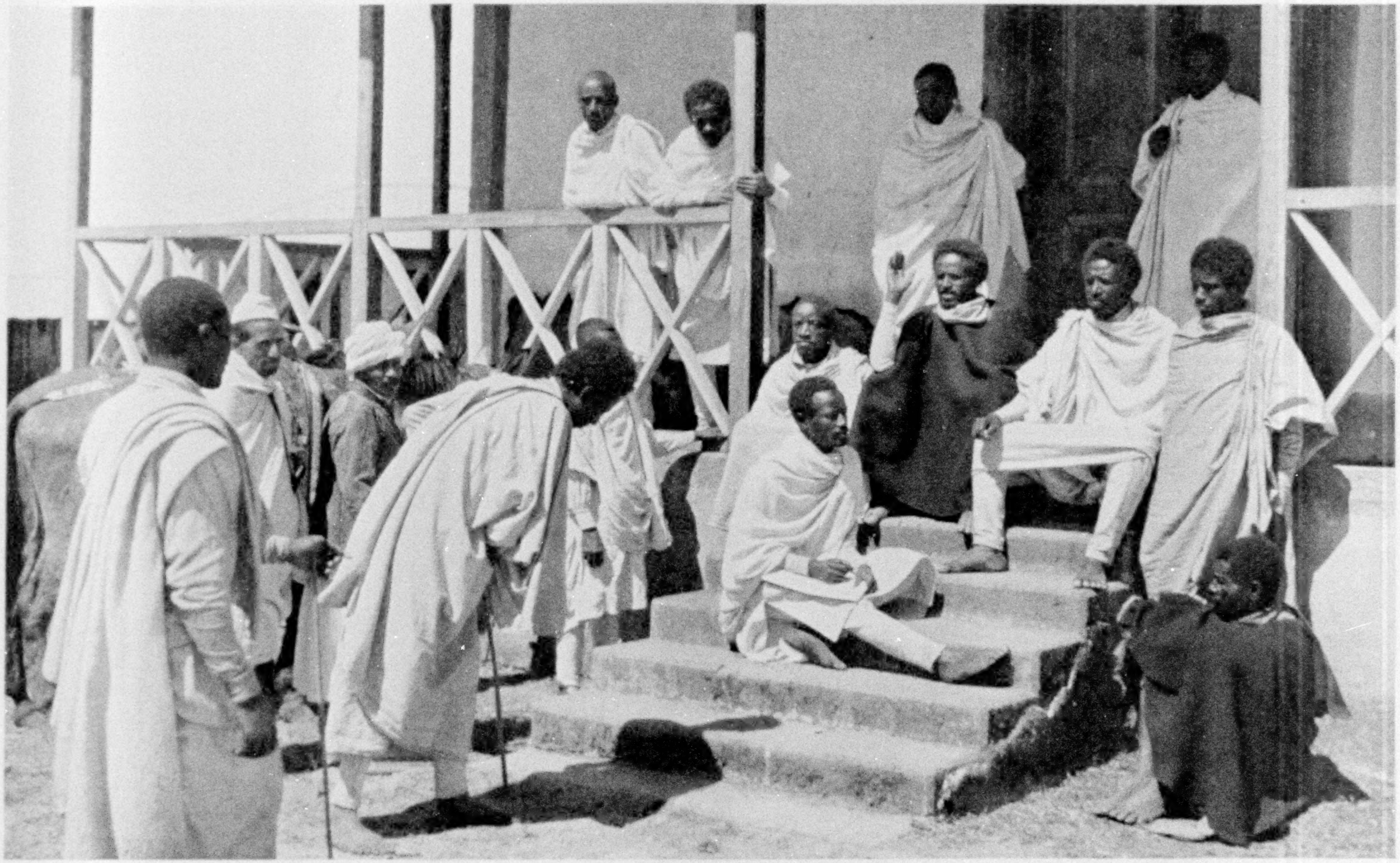

Photograph by E. A. Salisbury from Ewing Galloway

A COURT OF LAW IN ABYSSINIA

The natives are inordinately fond of trials and on the most trivial pretext they carry their disputes before some local dignitary (see text, page 661). Jury trials have not yet been introduced.

Every Abyssinian carries a rifle; he may have no ammunition, but the rifle is as much a part of his dress as his *chamma* (toga).

When we had been about an hour on the march the caravan suddenly halted. Some of the men came running back to me and reported that a mule carrying one of the steel boxes was missing. I hurried up and found, as might have been expected, that it was the box I treasured most. It contained my photographic supplies, all my letters of credit, all the letters that Ras Taffari had written to the local chieftains directing their assistance, the customs pass, and numerous other objects that were invaluable.

To find the mule seemed hopeless. Where cultivated, the valley was covered with a growth of grain sorghum 18 feet in height. The uncultivated areas were overgrown with grass seven or eight feet in height. The loss of the box meant no photographs, endless trouble with local authorities, and our arrival in Gallabat without funds.

While I was revolving in my mind the steps that might be taken, Ali, one of my tentmen, reported that he had seen a stranger standing beside that particular mule in camp that morning.

Leaving only enough men to hold the caravan together, the rest of us scattered over the country. Ali mounted a mule and galloped back to camp, where on his arrival he found some of the farmers of the hills returned to their work. He told them of what had happened. They asked to be shown the spot where the man and the mule had been seen. Ali indicated the spot.

ABYSSINIANS PROVE KEEN TRACKERS

We had camped on a piece of grassland from which the grass had been cut. Despite the fact that 40 animals had grazed here all night and had wandered over it after being packed in the morning, the natives were able to track the missing mule across the grass stubble and into a grain sorghum field, in the center of which the animal was found tied to a tree with his mouth bound shut to prevent his braying, and 50 feet farther along was the steel box, which the robber had been unable to open, but which he doubtless expected to examine that night at leisure.

Beyond Majetie we drifted along day after day through picturesque valleys, always with the escarpment to the left.

CAMP SITES AMID IMPRESSIVE SCENERY

Our camp sites often commanded most impressive mountain views. The population was less dense and we were usually able to pitch our tents in the shade of large trees. One night we camped above a salt marsh where, according to the natives, there were large animals resembling buffaloes. I went hunting for them with a 16-gauge shotgun loaded with balls. I was fortunate in not meeting with any.

On another occasion we camped on the flat pasture land in a section of the valley occupied by Mohammedans. Villages consisting of clusters of thatched huts were infrequent on a bare, close-grazed plain. There were occasional groups of trees, remnants of an extensive forest. The eastern escarpment, a full two days to the west of us, rose like a mountain range. Just across the river, in a small neck of woodland, were dozens of dig-dig, a species of antelope. Flocks of waterfowl settled on the river.

That evening stands out among those of the eastern trip for two reasons—the sunset and the hyenas. The sunset was beautiful, and Sewall and I sat for a long time watching the colors to the west. It was followed by the hyenas. One of the Mohammedan herdsmen had left a live cow among the trees and shrubs 100 feet from our camp. The hyenas found her about the time we went to bed.

I never hope to hear so much discordant noise in the same space of time. The diabolical laughter of a dozen of the beasts seemed to taper off into hideous screeches. The wrangling and, as our interpreter expressed it, "the shouting" of the repulsive brutes continued for an hour, after which there was no more cow to wrangle about.

Later, in Dessie, I had occasion to pass along one of the streets three times within two hours one evening. When I first passed I saw a dead mule lying in the middle of the street. I commented that it was a peculiar place to leave the animal

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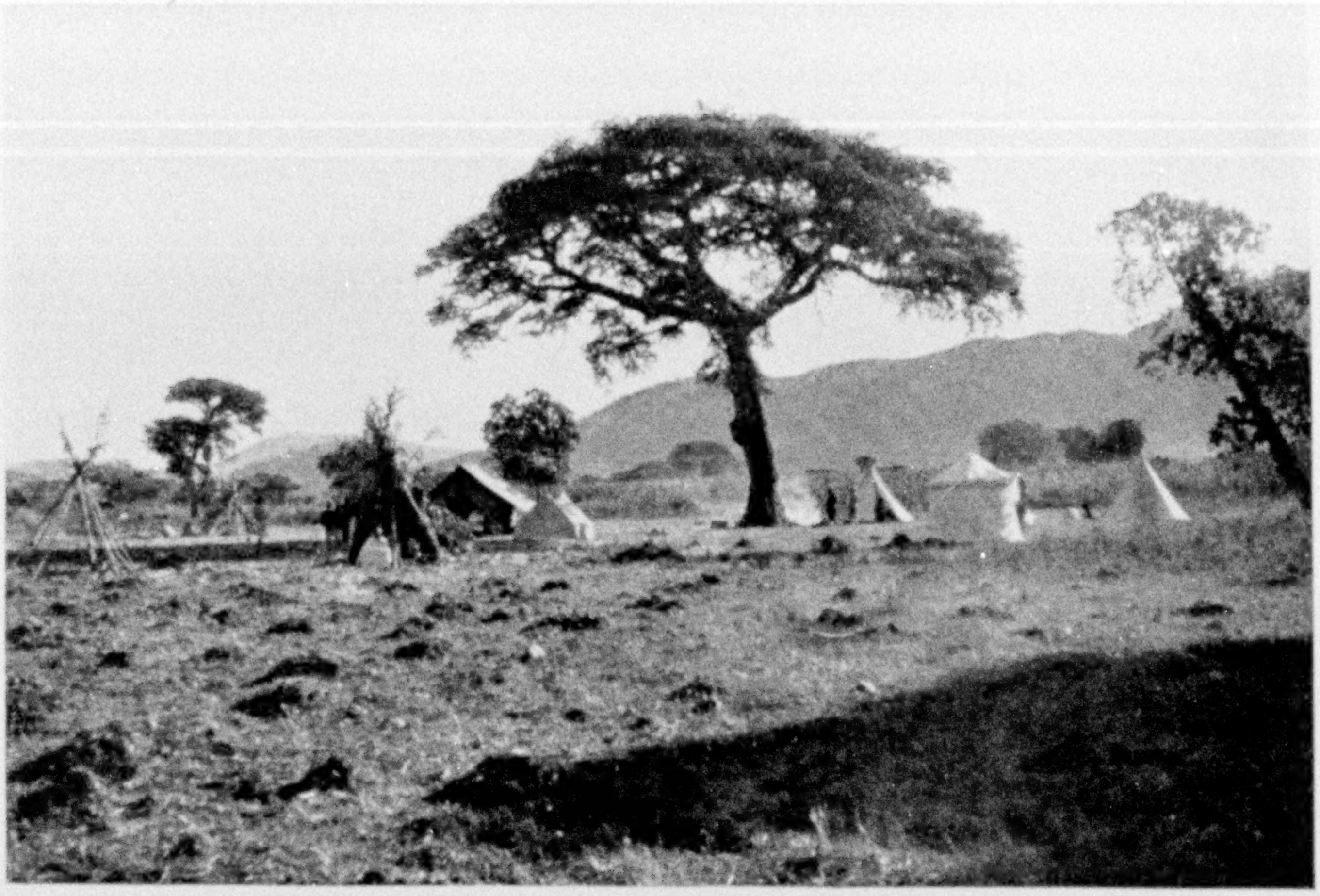


Photograph by Harry V. Harlan

A CAMP EAST OF THE ESCARPMENT

Tents have been pitched in a sparsely settled valley, where large trees are found. The extreme eastern edge of the Abyssinian plateau breaks abruptly into a great escarpment, at whose side the Christian Amharas have withdrawn their villages from the valleys, leaving a minor ridge of the plateau to the Mohammedan Gallas. The valleys are a sort of "No Man's Land," for during the day the agricultural Amharas descend to plant sorghum and the pastoral Gallas to herd their cattle. The Gallas, a Hamitic people, form the majority of Abyssinia's population.

and was informed that the hyenas would save the owner the trouble of removing it. Passing the same way an hour later I saw that the viscera and part of the hind quarters were gone. On my return, in less than an hour, I did not find a single trace, not a fragment of bone or a wisp of hair.

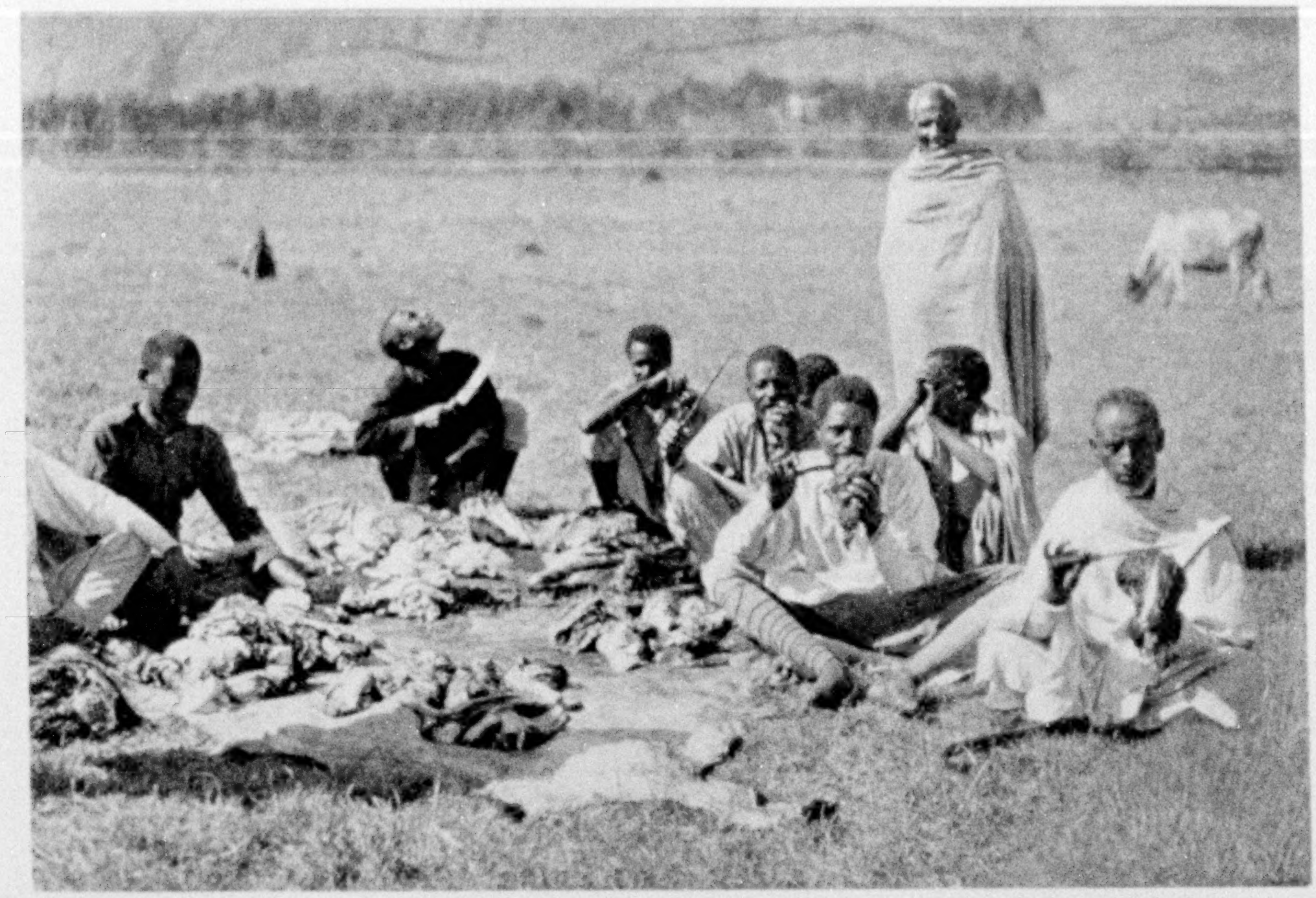
Some time later, while in a camp on the shores of Lake Tsana, I was disturbed one night by a dialogue between a dog belonging to one of my soldiers and a hyena 50 feet from my tent. The dog would bark; then, after a pause, the hyena would howl; another pause of equal length, and a bark from the dog was followed by an accurately timed howl from the hyena. The conversation seemed endless.

On the last day before we reached Dessie we were continually off the trail. Our supposed leaders conducted the caravan through brush and scrub, over hills and across streams, until the mules were exhausted and the baggage snagged and broken. At last we found the main highway and camped in the government inclosure at Dessie the day before Christmas.

A CHRISTMAS CELEBRATION IN DESSIE

We had finished the worst sector of our trip. The country ahead was more settled, and after Yedjo (Yejju) we would be on the plateau until the final dash to the Sudan.

Ras Cabada, the chieftain of the district, asked us to an evening dinner, and Taro Auri, his youthful aide, invited us to his house late in the afternoon to meet his wife, who was interested in us as the first people of European extraction whom she had had opportunity to meet. Taro Auri is a man about the age of Ras Taffari, both being in the early thirties. He is intelligent and capable, and it is



Photograph by Harry V. Harlan

MEMBERS OF THE CARAVAN ENJOY A MEAL OF RAW BEEF

Raw meat is the preferred food of the masses, but, being too expensive for frequent consumption, does not take the place of their mainstay—bread. The usual method of eating is to hold in the left hand a bone to which is attached a large piece of meat. The native loosens, but does not completely sever, a small bit of meat from the bone, puts the loose end between his teeth, and cuts off the other end by an upward stroke of his knife. One of the men (at the back) looks up resentfully at a bird which swooped down and snatched his meat from his hand.

upon such as he that the future of Ethiopia depends. Power will soon shift from the hands of the generation of Ras Cabada, Ras Gougsa, and Ras Nado to those of Taro Auri, Melke, and men of like age.

The wife of Taro Auri was the most intelligent native woman I met in Ethiopia. Her questions were pertinent and the bits of information volunteered were highly interesting. It was very evident, from the freedom with which she entered into conversation and from her bearing toward us and toward the retainers of the household, that the position of the wife in Amhara is one of much greater liberty than in the Orient generally. As far as our reception and entertainment were concerned, she was an equal partner with her husband (see page 640).

We found our host and hostess so entertaining that darkness had fallen before we recalled our other engagement. There was a great scurrying about to saddle horses and mules, and the ride which followed was spectacular. It was inky dark, with that darkness whose existence city residents so frequently forget. Hundreds of men attended us, bearing lighted torches. I regretted that we could not be at a distance to witness our own progress as we galloped down hills, across streams, and over open fields—a wild, unorganized mob

COURTEOUS RECEPTION AND ENTERTAINMENT AT A CHIEFTAIN'S HOME

The home of Ras Cabada, like that of all the greater chieftains, is situated upon the crest of a hill chosen for its strategic importance. We passed through inclosure after inclosure, and at each encircling barrier we came upon bodies of armed troops standing at attention. A very sizable army was present for the ceremony of our reception.

The higher officials were gathered about the chieftain's doorway. Passing between

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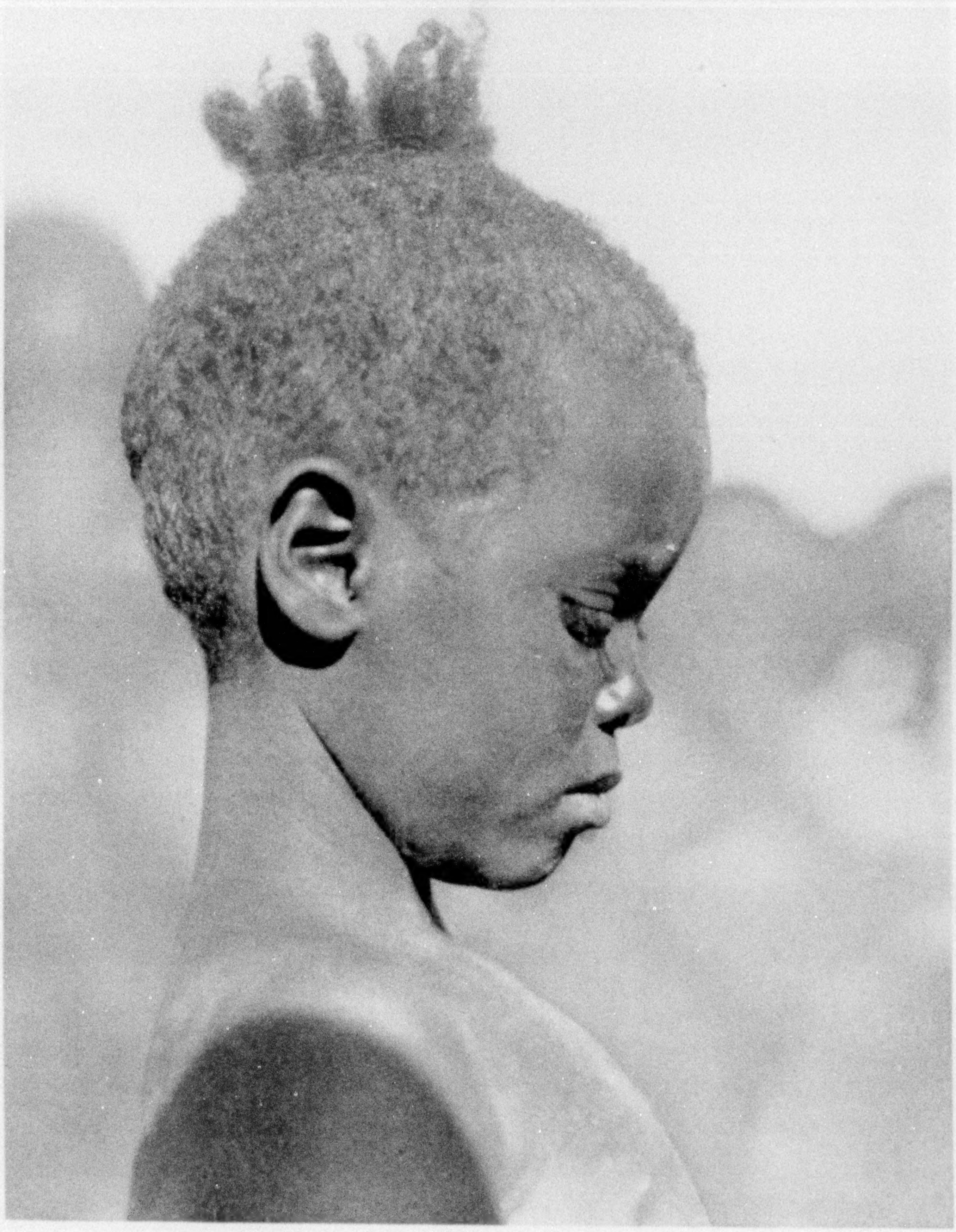
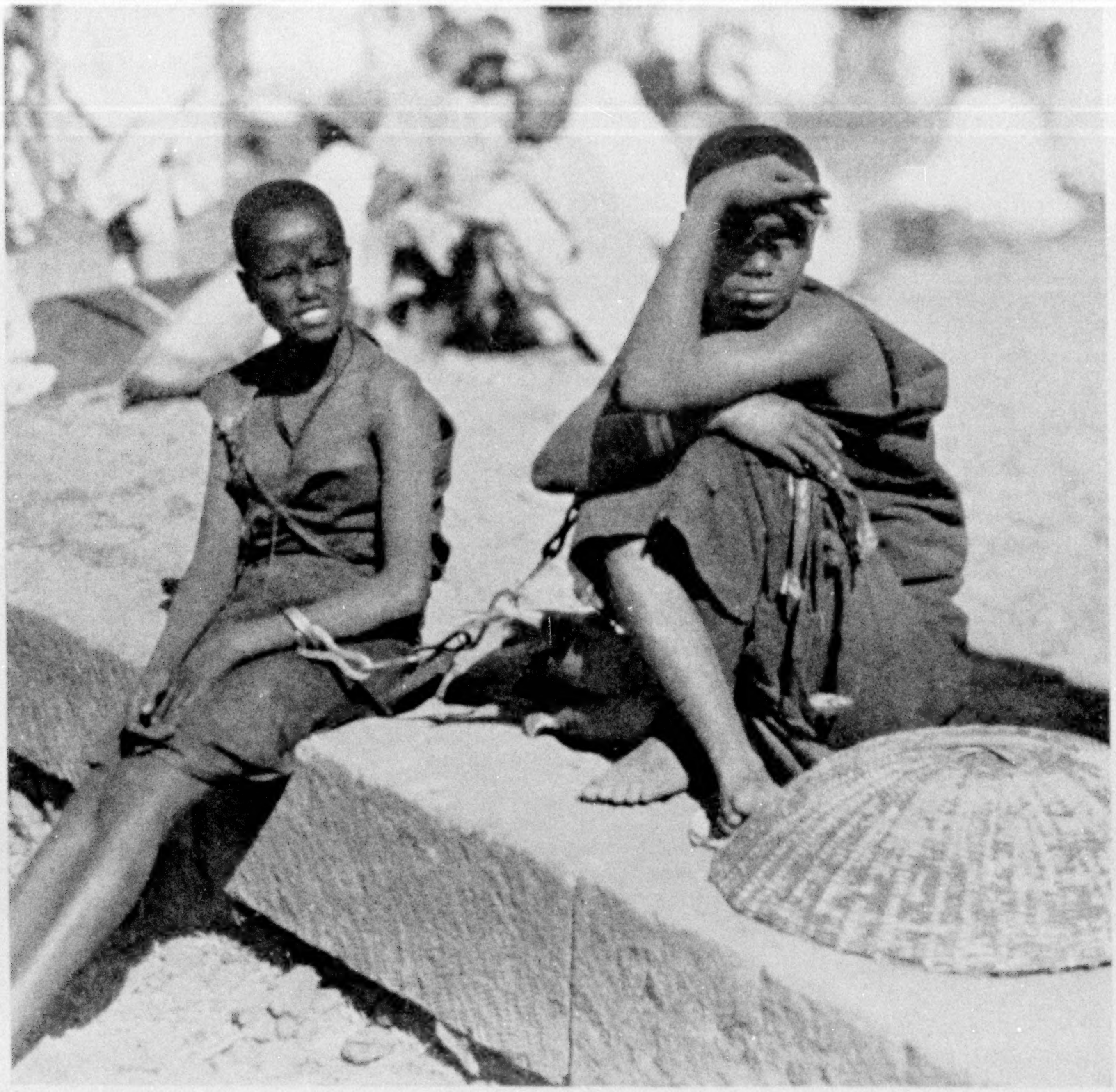


Photograph by E. A. Salisbury from Ewing Galloway

THE ABYSSINIAN "BOB"

This is the style of haircut in vogue among the juveniles of Ethiopia.



Photograph by E. A. Salisbury from Ewing Galloway

HOW LENDING AND BORROWING ARE DISCOURAGED IN ABYSSINIA

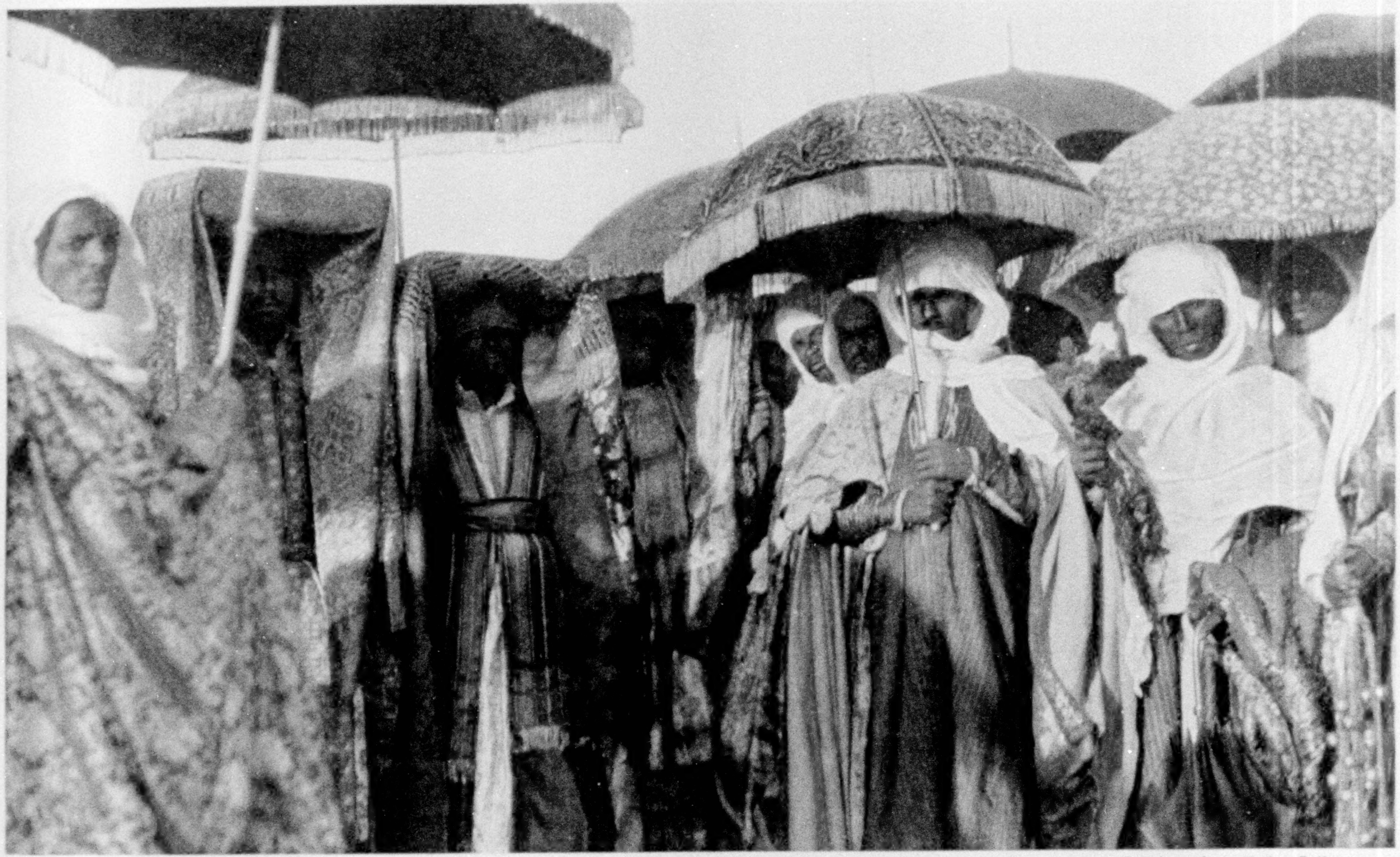
The debtor and the creditor are chained together until friends or relatives settle the indebtedness, with the result that there are few "loan sharks" in Ethiopia.

rows of councilors robed in spotless white chammas, we were conducted into the presence of Ras Cababa and his wife. He was bareheaded and about his shoulders was the blue cape of a high official.

His home was a little better than that of most of the chieftains. Ordinarily the residences of the headmen differ from those of the peasants only in size. The typical house of the plateau consists of a circular stone wall, a thatched roof, and a dirt floor. Furniture, other than a basket or two and perhaps a crude stool, is lacking. Sometimes a minor chieftain is the possessor of a chair, which is ceremoniously carried about wherever he goes. As a matter of fact, he prefers to sit on a cushion placed on a rug.

The home of Ras Cabada was provided with chairs, a table, tableware, and many other innovations, and he very courteously attempted to give us a European dinner.

There were six kinds of wine on the table, varying from a good honey tej to sparkling Moselle and champagne, and there were numerous courses of well-cooked food. We started with sweets and a tiny glass of brandy and ended with hors d'œuvre, but the meal itself was good and the effort to provide us with the things we would desire was the outcome of the thoughtful attention of a gentle-



Photograph by E. A. Salisbury from Ewing Galloway

HIGH PRIESTS OF THE ABYSSINIAN CHURCH ON A RELIGIOUS FEAST DAY

Note the square, boxlike headgear, covered with multicolored silks, worn by two of the men at the left. The parasols are of elaborate velvet of many colors spangled with gold embroidery. The priests wear silken colored gowns.

man. As it was our Christmas Day, it was doubly appreciated.

During the morning we had provided sports for the men as a relaxation from the hard service they had seen in the previous two weeks. Prizes were awarded to winners of various races and contests. Afterwards we presented them with a bull. The bull was promptly slaughtered and the men, seating themselves beside the newly dismembered carcass, proceeded to stuff themselves with the still warm raw meat (see page 647).

HOW THE ABYSSINIANS EAT RAW MEAT

The eating of raw meat by the Abyssinians is interesting. Most of their meat is so consumed. Once on the trip I was calling on a local chieftain. After he had regaled me with some home-brew of none too clean appearance, he told me to call in some of my servants and he would care for them.

I sent for eight of the leading members of the caravan, who seated themselves in a circle on the dirt floor of the house. Two of the chieftain's servants then entered, bearing a sheep suspended from a long pole. The carriers stood outside the circle. My men pulled out their knives and cut off strips of flesh until they were satisfied. Little more than a skeleton remained when they had finished.

The usual method of eating is to remove a large piece of meat attached to a bone. The bone is held in the hand, and with the knife a small piece of meat is loosened by a cut from the base of the chunk. The piece is not entirely severed, but remains attached at the tip. The loose end is then grasped in the teeth and the other end freed with a second upward cut. To an observer it appears that the diners are in constant and imminent danger of severing the ends of their noses.

North of Dessie we passed by Lake Haik. This section was of especial interest. The population was sparse and there were extensive remnants of a juniper forest.

A few days later we came into the prosperous district of Yedjo, with a better balanced agriculture than that of the territory through which we had just passed. Its ruler, Dejasmatch Altimariam, is a merry old man with a delightful twinkle in his eye. He paraded a detachment of soldiers for us and adopted Sewall as a son (see illustration, page 642).

AN ARDUOUS CLIMB UP THE ESCARPMENT

We now turned west, and in one day's march were along the base of the escarpment.

We rested the mules a day for the climb, and it was well we did, for this was the most arduous stage of the journey. We started early and climbed for hours. We seemed to be always mounting, always getting higher and higher over the valley, but never any nearer the top.

Finally, about noon, we came upon a flat bench at the foot of the last cliff. There were numerous fields of emmer, wheat, and barley planted among the bowlders. I photographed many of them while waiting for the caravan to arrive.

After a brief halt we started up the last unit of the escarpment. It appeared to be only a short distance above us, but the caravan arrived at the crest two and a half hours later, completely exhausted. I photographed the same grainfields from the edge, pointing my camera straight down.

Again we found ourselves on the plateau, after 18 days on the lowlands of the east. The water three feet from the edge of the escarpment flowed west.

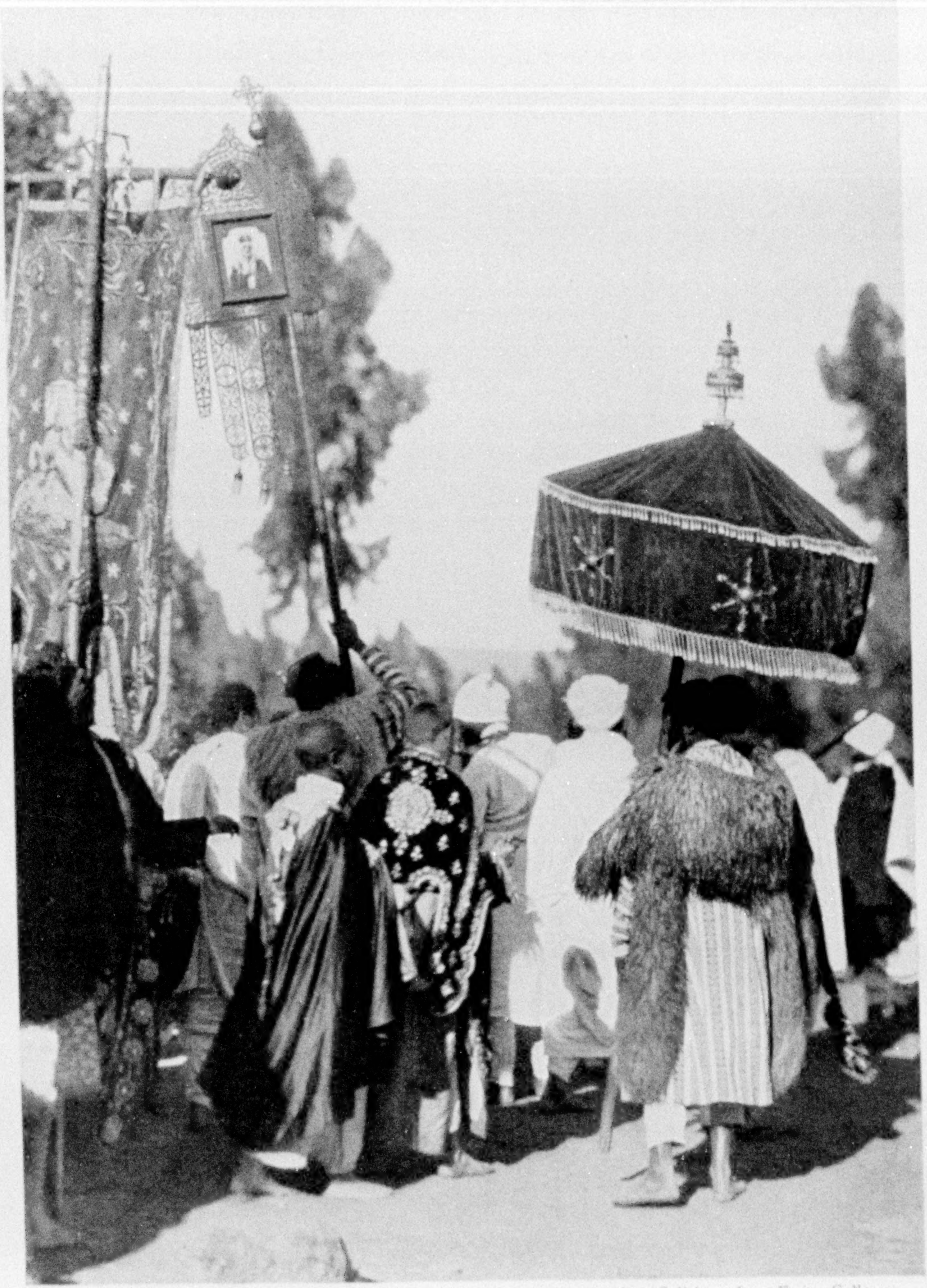
Six hundred yards farther on we camped at the headwaters of the Takkazye River, among barley and emmer fields, on a treeless plateau. We were amazed to find living water so high. True, it was a tiny stream, but very far from where the Atbara joins the Nile.

That night ice formed and remained unmelted until long after sunrise. The emmer fields alongside were not affected, though they were in full flower.

LALIBELA, THE JERUSALEM OF ETHIOPIA

We hurried our journey down the Takkazye, as we wanted to be in Lalibela for the Abyssinian Christmas, which comes on January 7 by our calendar.

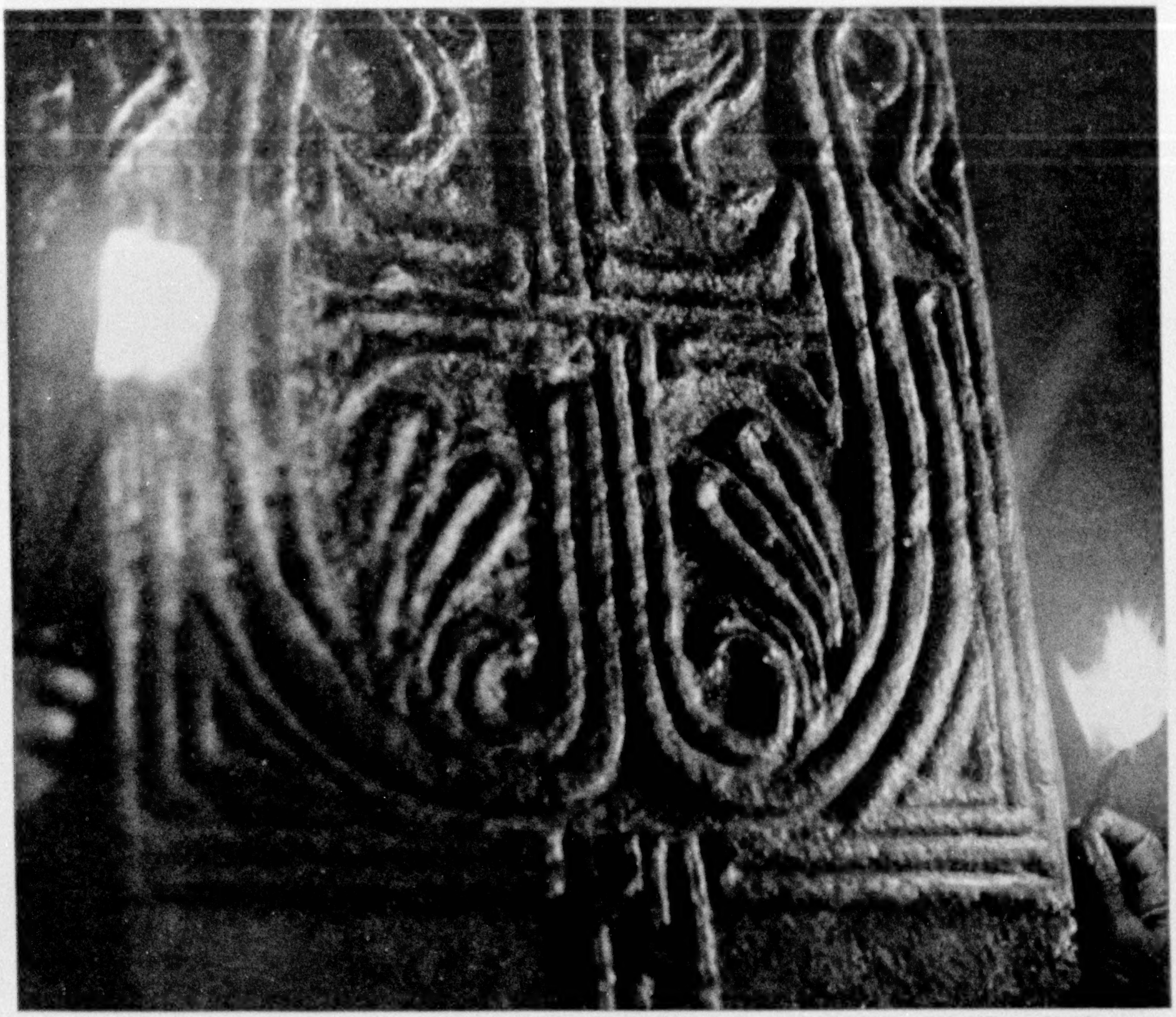
Our visit to Lalibela was the most interesting single incident of the trip. It seems unbelievable that a city so important in the religious life of a country could be so little known. It is, in a way,



Photograph by E. A. Salisbury from Ewing Galloway

ABYSSINIAN PRIESTS IN PROCESSION

Abyssinia has been a Christian kingdom since the first half of the fourth century. The inhabitants are mainly of the Coptic Church.



Photograph by Harry V. Harlan

A CROSS ON A PILLAR OF A LALIBELA CHURCH

This symbol, akin to a Maltese cross, was photographed because of its possible significance in approximating the period of the construction of Lalibela's rock churches. Since the churches lie in deep holes, little light penetrates through the decorative fretwork of stone on the windows, and it was therefore necessary to have two natives hold candles alongside the pillar when the photographic film was exposed (see text, page 655).

the religious center of Abyssinia. The natives refer to it as the Jerusalem of Ethiopia and have tried to reproduce many of the physical features of that holy city. It is the great religious pilgrimage center of the Amharas.

The Christmas celebrations are the climax of the Coptic pageantry of Ethiopia, and thousands of believers come from the Tigré, from Gojjam, and from the Shoan provinces, and camp about the hills until every available site is occupied. Yet, despite the importance of the city, not half a dozen Europeans have ever visited Lalibela. So far as I could learn, Mr. Sewall and I were the first English-speaking people to visit it and the first outsiders of any nationality to witness the Christmas celebrations.

The infrequency of visitors is all the more striking, because the place has been known for many centuries. Francisco Alvarez, Portuguese missionary and explorer, wrote an extensive account of its remarkable churches, following a trip made in 1520. According to C. F. Rey, there have been one German and two French expeditions since that of Alvarez.

Ras Taffari had sent word ahead that we were coming, and that courtesies should be extended to us. When we arrived near Lalibela thousands of pilgrims were gathered before the village, and the head priest awaited us on an open hillside with scores of his priests as a background.

The priests were dressed in their most elaborate costumes—blue, red, purple,

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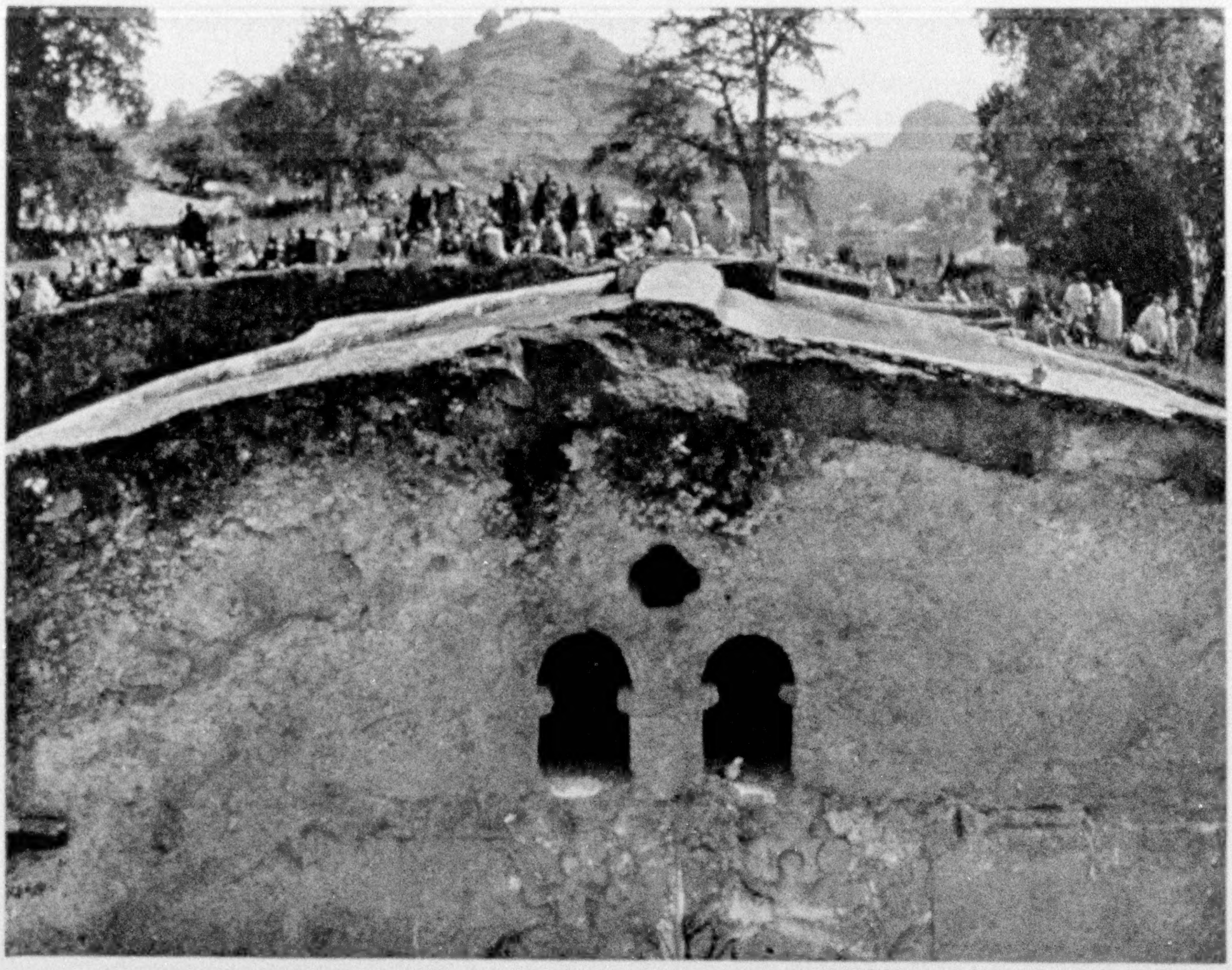


Photograph by Harry V. Harlan

THE UPPER END OF ONE OF THE ROCK CHURCHES OF LALIBELA

The Jerusalem of Ethiopia is the religious pilgrimage center of the Amharas. Its famous rock churches, ascribed to Lalibela, a semi-mythical Abyssinian king, are cut from a single stone ledge of red volcanic tuff and are of one piece, from entrance to altar and from altar to roof (see text below). Each is properly oriented, and the interior decorations, especially the pierced latticework, have some beauty. Few foreigners have visited Lalibela and its churches, notwithstanding the importance of the town.

and other colored cloth embroidered in gold. Gold and silver crosses of large size abounded, and there were dozens of bright-colored parasols with gold fringes. After the preliminary songs, greetings, and prayers for our safety were over, the priests danced for us—danced as they probably did in Palestine before the Christian Era.

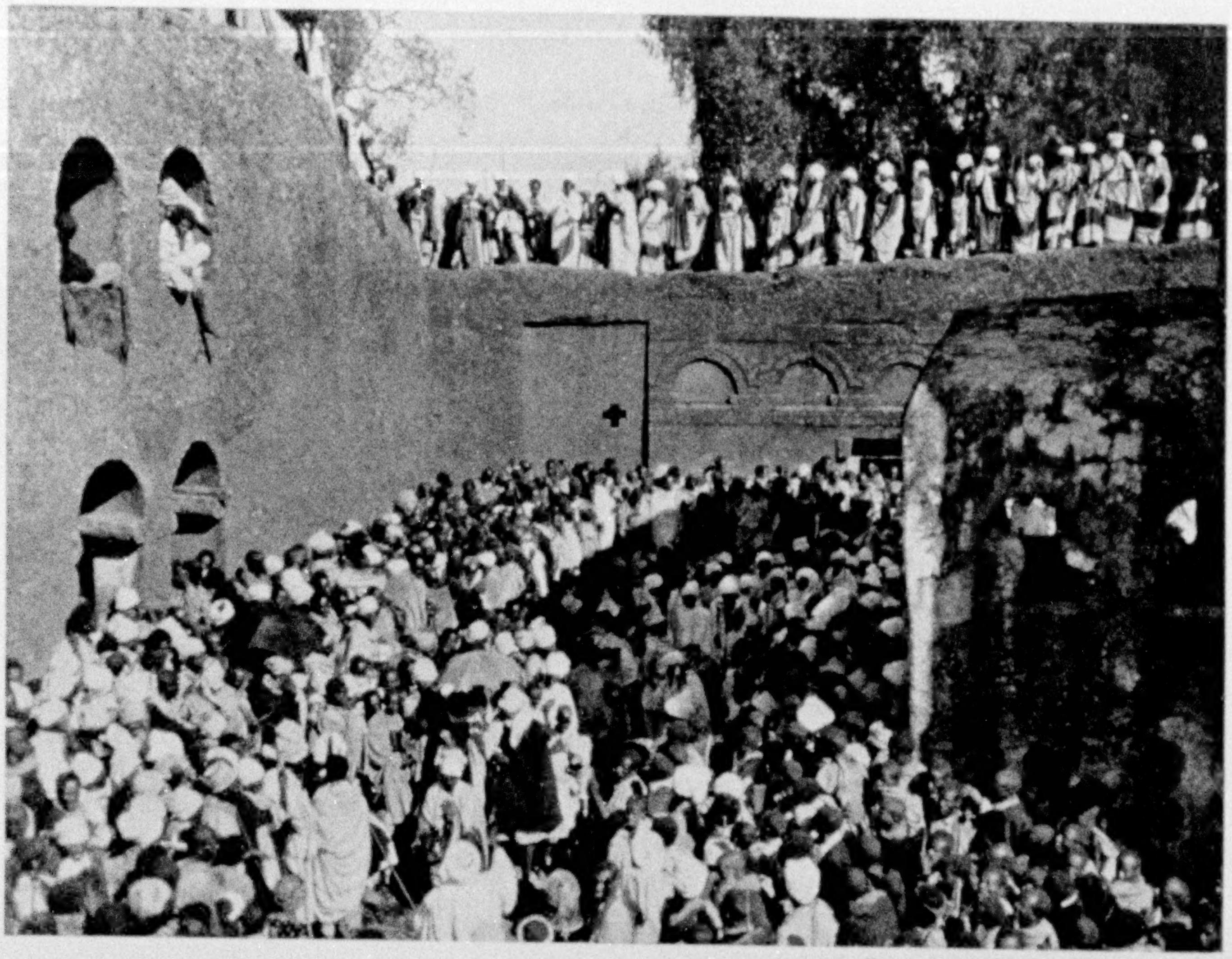
CHURCHES HEWN FROM THE LIVING ROCK

We then entered the village to see the churches—ten great monolithic buildings cut from a single stone ledge of red volcanic tuff.

Each church had been made by first excavating a courtyard of ample dimensions, leaving in the center a great block of stone the height of a three-story edifice. In this rock the building was carved, with the final effect of a structure of stone or concrete erected by modern masons. The doorways are just as perfect, the walls as true, and the windows as numerous as if the churches were built of bricks.

Inside there are pillars, and between them are arches dropping below the ceiling. There are altars, alcoves, and galleries. Yet the whole is from a single rock and, with the exception of minor repairs, made a hundred years ago, following an earthquake, they are of one piece, from entrance to altar and from altar to roof.

In the one known as the Church of Lalibela there are figures in relief against the wall. One of these represents a badly diseased young man. He was disobedient and ran away when his father wished him



Photograph by Harry V. Harlan

THE CHRISTMAS CELEBRATIONS AT LALIBELA

These festivals, the climax of the Coptic pageantry of Abyssinia, are witnessed by thousands of believers. Clad in gorgeous costumes and bearing sacred objects, the priests encircle the walls about the Church of Mascali Jesus after three boys with whips have cleared the way. The procession required two hours to march around the church. Of the 30,000 pilgrims who had gathered for the occasion, not more than 1,000 could see the whole pageant.

to marry. The Lord punished him by afflicting him with an incurable ailment.

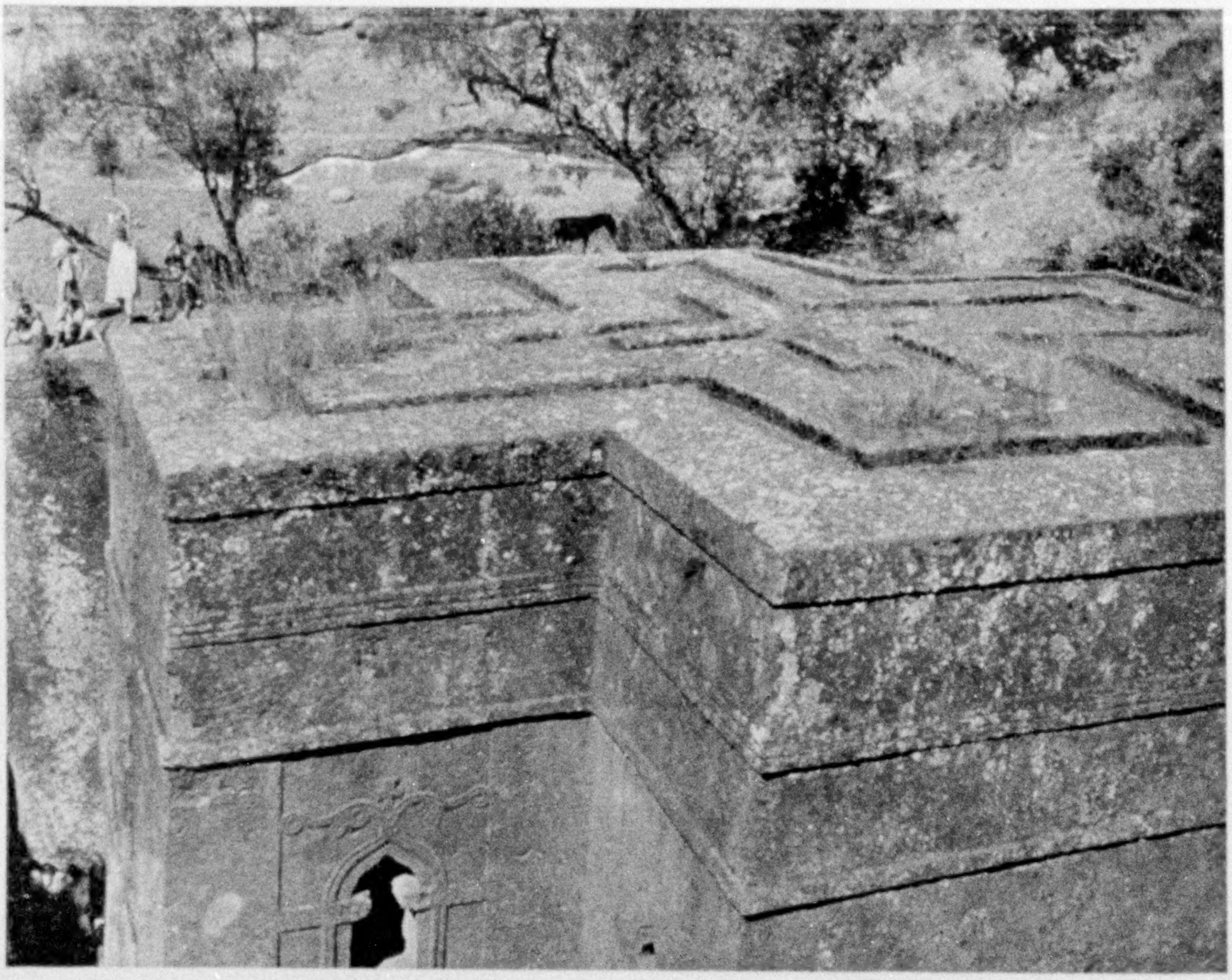
In another of the churches are carvings on some of the pillars. One of these is a symbol akin to the Maltese cross. Because of its possible significance in approximating the period of construction, I desired to photograph it. Pictures, however, were hard to obtain. The churches were in deep holes, and parts of both courtyard and church were continually in shadow. Inside, it was much worse. The windows were mostly obscured by the fretwork of stone left to decorate them, and little light penetrated to the interior.

In order to furnish light, I had two men hold candles alongside the pillar and exposed a film for several minutes directly at the candles. I was amazed later to find that I had secured a good negative of the cross (see page 653).

In one of the principal churches there is a major column which extends past the gallery to the roof. It has been covered by cloth for centuries and is so sacred that no one is permitted to touch it. I would have given much to have seen beneath it, for it was the most logical place of all for significant decoration.

In some of the courtyards there are sacred pools, one of which contains water said to have been brought from the Jordan many years ago (see page 657). According to the priests, it has not evaporated or decreased. Incidentally, it may be mentioned that the courtyard drains directly into this basin. Indeed, these reservoirs were in all likelihood cut into the rock at the lowest point of the courtyards to afford drainage, as otherwise the water would stand about the churches in the rainy season.

The largest of the churches is Medani



Photograph by Harry V. Harlan

THE UPPER THIRD OF THE MONOLITHIC CHURCH OF ST. GEORGE: LALIBELA

This edifice, one of the most beautiful of the rock churches, stands apart from the two groups of buildings. It is in the form of a cross and a cross is carved upon its roof. St. George is apparently the patron saint of Ethiopia, being the one commonly pictured and having many churches named for him. The natives of Lalibela point out footprints of the saint's horse on the wall of a defile, said to have been made when he came to Lalibela to demand that a church be erected in his honor (see text below).

Alam. The arched design of the interior is constructed as a relief on the roof, and is probably the feature referred to by Alvarez when he wrote of arches meeting above the roof of the churches.

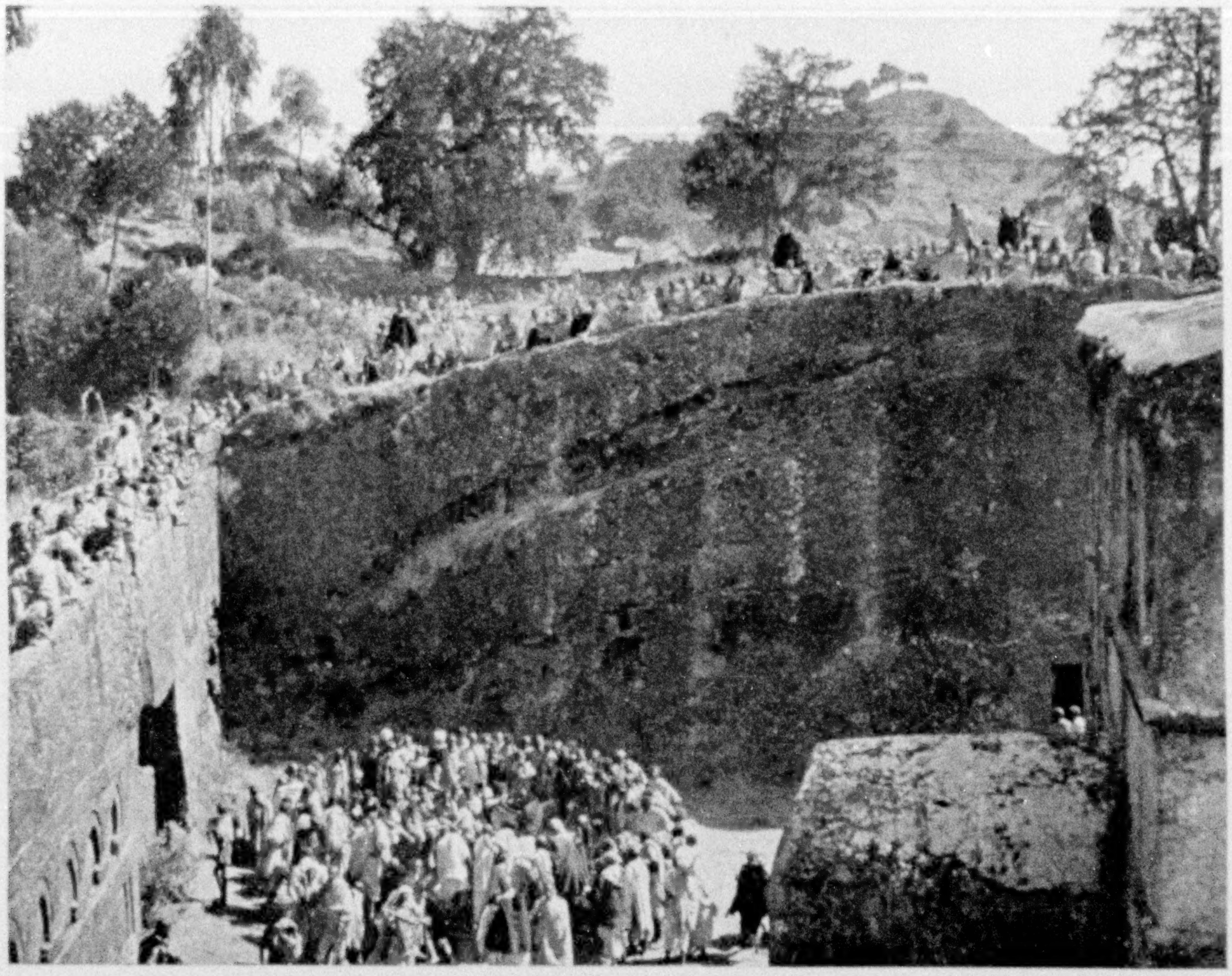
THE LEGEND OF THE CHURCH OF ST. GEORGE

There are two groups of churches, one of five and the other of four buildings, while the church of St. George stands alone. Between the courtyards of the churches are walls from 6 to 12 or even 15 feet in width. In some, rooms are hollowed in the partitions, and in one a church has been excavated. The outer approaches to some of the churches are through inclined defiles. These are narrow and very deep and were probably used in removing the excavated material during construction.

One of the most beautiful of the churches is that of St. George, which is in the form of a cross, with a cross carved upon its roof. St. George seems to be the patron saint of Ethiopia. He is the one most commonly pictured, and churches without end are named for him.

At Lalibela they have a fantastic tradition that St. George was so displeased when he saw numerous churches being built in honor of others, that he mounted his horse and came galloping to demand that a church be erected to himself. They point out the footprints of his horse, which happen to be in the perpendicular wall of the inclined defile made in the process of excavating for the church, but this discrepancy apparently does not spoil a good story.

The head priest himself was our guide and led us through the churches, pointing



Photograph by Harry V. Harlan

A SACRED POOL IN LALIBELA

This corner of a courtyard in the holy city of Abyssinia is said to contain water brought from the River Jordan (see text, page 655).

out features without end. He showed us a representation of the trial of Christ; the tomb of Adam; a stone that no unbeliever can lift, but which is easy for believers; and other sacred marvels.

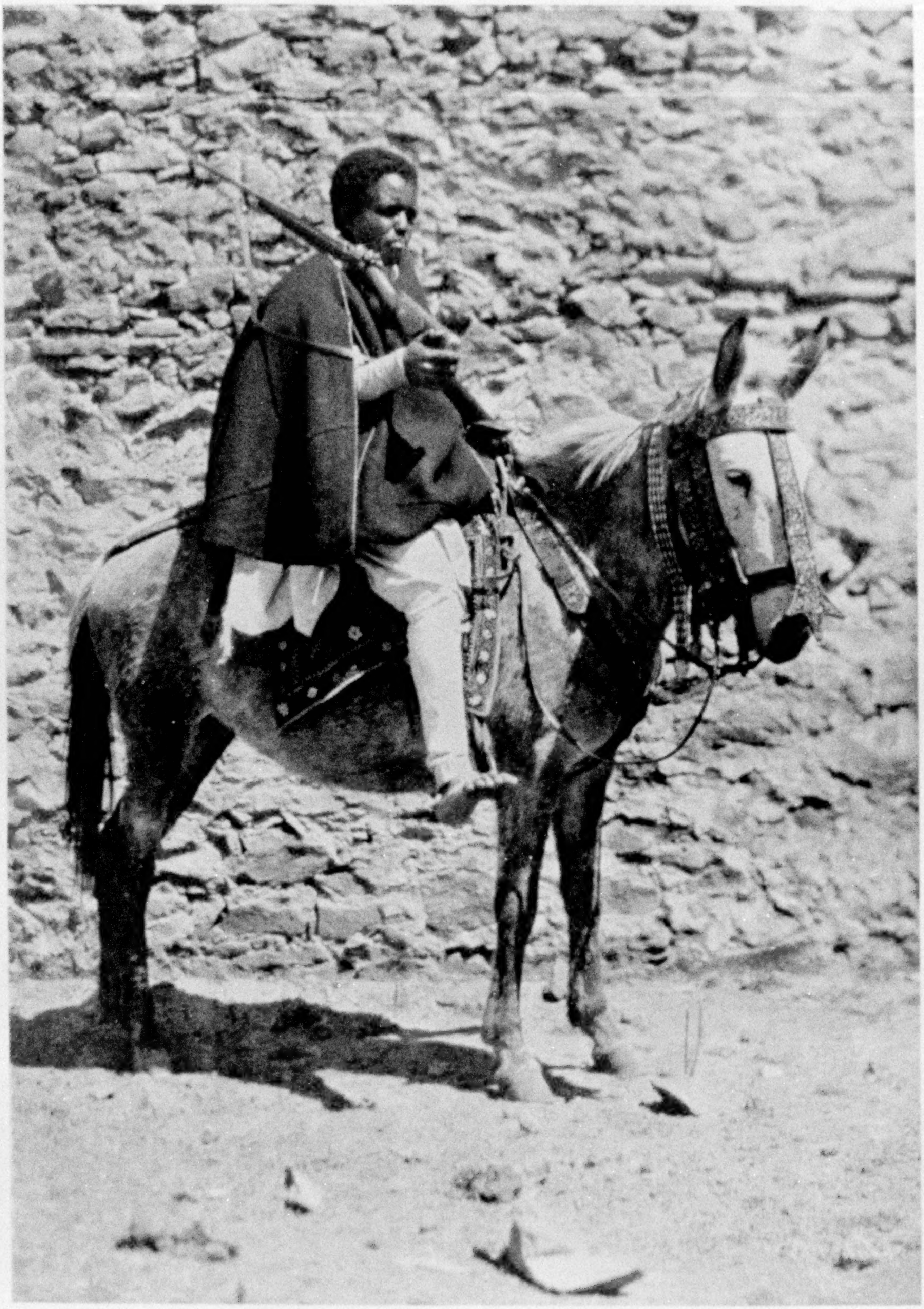
At last, while passing through a corridor, the holy man stopped and his servant held a chamma so as to conceal him. I discovered that he was removing his embroidered trousers. Trousers other than the loose pantaloon are a mark of rank and are supposed to be worn by such dignitaries as Ras Taffari, the Empress, and the head priest. The latter can change his clothes only in the church, and as we had finished our tour, he was preparing to return to his home in comfort.

The crowds of Lalibela were endless and we were in continual contact with persons suffering from many contagious or infectious diseases. Before the entrance to Medani Alam we walked down a long aisle of lepers seated in the dirt, scores of them in the most advanced and repulsive stages of the disease. Behind the lepers were banks of invalids without number, hoping for miraculous cures. In the meantime they were not missing any chances to collect alms.

THE TRAVELER'S FEAR OF INFECTION MUST BE DISREGARDED

Years of travel in the Tropics causes one to lose, or at least to disregard, his fears of contracting certain appalling diseases. Familiar precautions are almost impossible to observe, and the consequences are soon looked upon from a fatalistic and unemotional viewpoint.

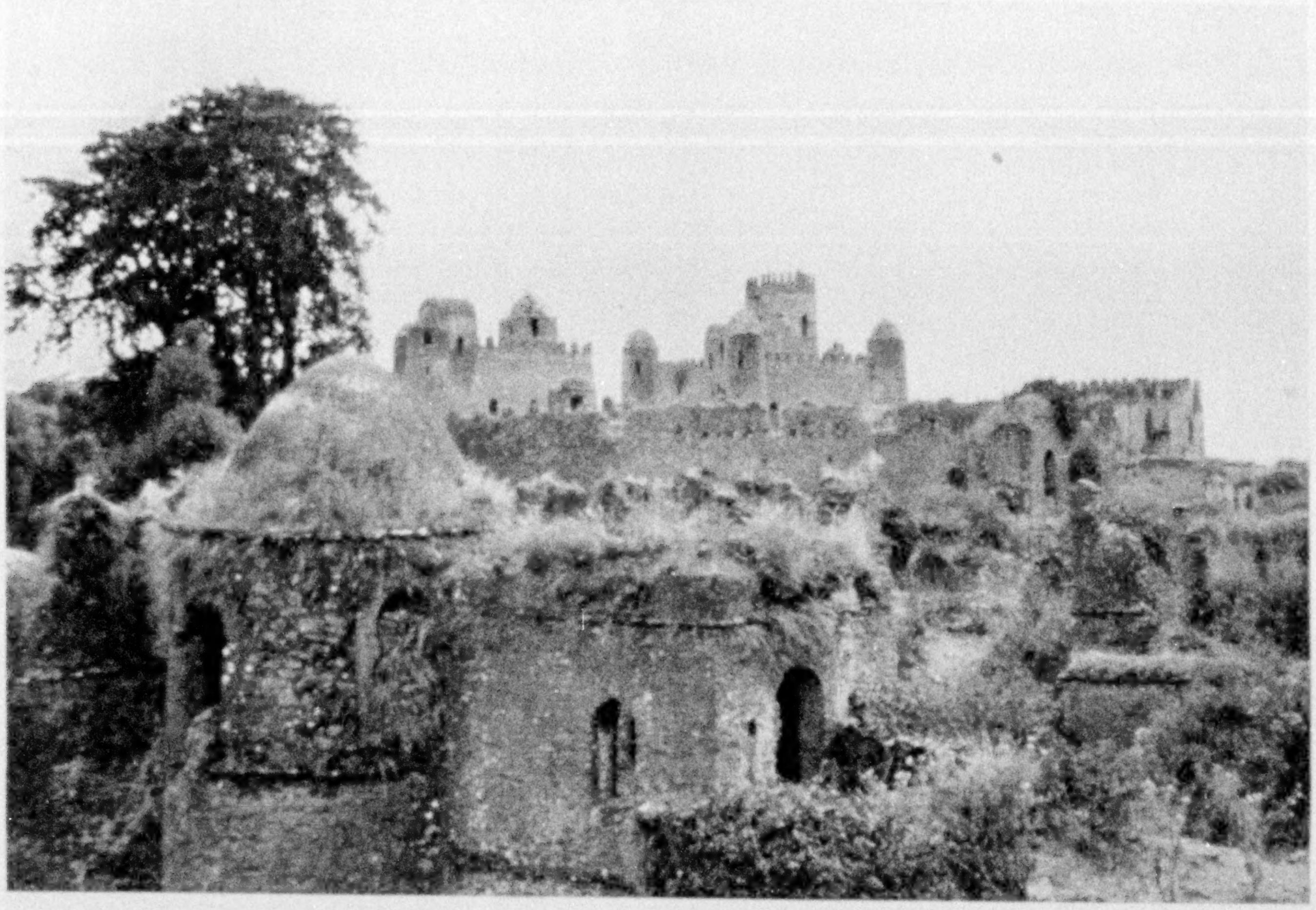
Wandering among the crowds of lepers did not perturb us, but another event was not so pleasant. The head priest led us down, through a trapdoor in the floor of one of the churches, to an underground tunnel which was supposed to represent hell. The tunnel was a low, narrow, vaulted passageway which extended horizontally for some hundreds of feet before



Photograph by E. A. Salisbury from Ewing Galloway

AN ABYSSINIAN MAN-AT-ARMS

Every noble of Abyssinia has followers who do no work, but are supplied with a gun and food by their leader. This man is of that type. The Abyssinian prefers to ride a mule except when on active war duty or traveling speedily. Note the narrow stirrup through which the barefooted soldier thrusts his big toe. The Abyssinian mounts from the right- instead of the left-hand side. Nearly all warriors are equipped with swords as well as rifles (see also illustrations, pages 626-628).



Photograph by Harry V. Harlan

THE REMAINS OF THE BETTER SECTION OF PORTUGUESE GONDAR

That Gondar was a great city in its prime seems proved by its vast area of tumbled stone overgrown with brush, where the less important personages lived, and by another section, of beautiful stone walls, ruins of churches, monasteries, and medieval castles, where the officials were housed. An imposing view is had over numerous blocks of walls toward the larger castle, with its towers notching the sky line (see text, pages 661 and 663).

it came to the surface again. In order to impress us with the full undesirability of hell, all candles were extinguished, and we felt our way along the walls in absolute darkness for many minutes.

This experience is one of the major thrills of Lalibela to the pilgrims, and the walls were grimed by the thousands of hands that had felt their way through in the past few days. Many of those hands were deformed by leprosy and scores of others bore actively infectious ulcers and other ailments.

WHIPS CLEAR WAY FOR PROCESSION

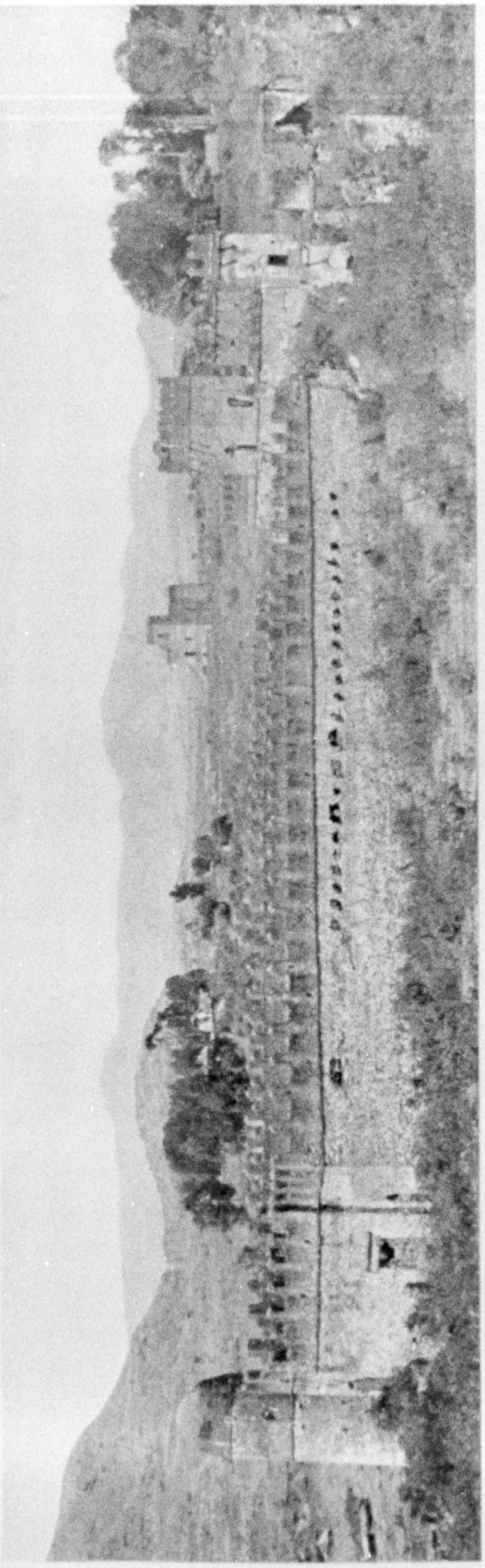
Lalibela's Christmas morning came. The festivities began early. The crowds had assembled long before we arrived, but space was reserved for us on the wall of the partitions surrounding Mascali Jesus, the church where the celebration was to take place. A procession of priests, dancing and singing, was to encircle the wall, while a second detachment marched through the tightly packed courtyard about the church.

Of the 30,000 pilgrims who came to witness the rites, not more than 1,000 could have seen the whole, though the line of encircling priests must have been visible from all parts of the village.

When the procession started, the walls where the priests were to go were jammed with spectators. At the head of the procession marched three youths carrying long leather whips, with which they cleared the way.

Such whipping is not resented here. In fact, we ourselves had been the cause of such chastisements. We were such a curiosity in Lalibela that hundreds of people followed us and ran ahead, crowding about, impeding our movements. The head priest finally detailed men with whips to clear paths for us on our numerous trips through the villages during the three days of our stay.

The people could do little else than



Photograph by Harry V. Harlan

PORTUGUESE RUINS AT GONDAR

The Portuguese were expelled from Gondar in the early 17th century, but during their occupancy of more than a hundred years they built much and built well. Gondar has the only well-constructed buildings in Abyssinia, other than the monolithic churches of Lalibela. The story of the actual construction of these imposing walls and buildings is lost in the maze of nebulous tradition which surrounds all Abyssinian history, but no Abyssinian mind conceived them (see text, page 663).

pack more closely on the walls, as there were courtyards of other churches behind them. Pack they did, and slowly the procession advanced, stopping minutes at a time while songs were sung and dances performed (see page 655).

The costumes were even more gorgeous than on the day of our arrival. Every costume in the possession of the churches was worn by some one and every sacred object was transported for the public to look upon. The procession took fully two hours to encircle the church.

Never will I forget one old priest who led in the music. His high-pitched, penetrating voice could be heard above those of all the hundreds singing. At sudden and unexpected moments it would seemingly pitch octaves higher, and just when he had reached what one supposed was the highest note of the human voice it would ascend again.

THIRTY THOUSAND ABYSSINIANS LEAVE LALIBELA SIMULTANEOUSLY

When the music stopped I made hasty adieus and rushed to my mules to get out of town ahead of the crowd. Thirty thousand Abyssinians did the same thing. We had sent our caravan on ahead and galloped down the mountain toward the Takkazye after it. We caught up with it in about three hours.

We passed many more people than it seemed possible could have been in the town. With a glass I watched others as they came, like ants, swarming along every road leaving

Lalibela. Even after we were camped by the Takkazye, miles away, they came in uninterrupted files.

In the afternoon occasional breaks occurred in the lines, growing more and more frequent toward night. Occasionally lepers stopped to beg. Usually they were on muleback, it being the common custom to mount the sufferers when they can no longer walk.

Hundreds of people camped beside us that night, and for days we saw them on the road, though most of them, traveling light, soon outstripped us. Many joined our caravan and camped with us all the way to Debra Tabor, and some accompanied us even to Gondar.

COPTS OF EGYPT MAY HAVE AIDED CONSTRUCTION OF LALIBELA'S CHURCHES

It was only when we had marched a day or two from Lalibela that we could begin to digest our observations. The crowds had been too dense for a careful exploration of the churches and it had been difficult to take photographs.

We did get a clue as to the most likely reason for the choice of the site. We were told of salt water in some of the recesses. Mineral and hot springs are common throughout Ethiopia. Salt water does have a disintegrating effect on the structure of many stones, and it is probable that the churches first constructed were in a part of the ledge where the rock was weakened. In the southern group there are one or two churches the roofs of which are not cleared. These are of the cave type frequently found in temples of India. In my opinion, these were the first churches excavated.

As to who engineered the rock churches I cannot guess. They are commonly ascribed to Lalibela, who reigned in the twelfth century, and there is an undated inscription in Arabic which credits them to him. They are unlike anything else that the Abyssinian builds or has built. Advice or even labor may have been secured from the Coptic church-builders of Egypt.

We were soon back in the routine of travel and Lalibela was far behind us. The road to Debra Tabor is an old, well-traveled one, with plenty of game along the way.

One day two of our men engaged in a dispute. They wanted a formal trial, so they appointed a judge and argued the case as they herded the animals along the trail. Hour after hour the jabber continued, until the elected jurist rendered a decision. The cause was of no importance; the trial itself was the thing (see page 644).

Abyssinians will hold a trial anywhere. At Lalibela we were following the head priest through a deep defile to a church whose chief priest appeared on the rim 30 or 40 feet above. The latter informed his superior that it was a holiday, and that he would not open the church for us if they cut his throat for his refusal.

He was immediately brought to trial and the arguments proceeded, the head priest shouting up and the chief of the church shouting down. After the dispute had gone on and on, one of my men brought the case to an unexpected close by asking how we strangers were to tell whether or not Lalibela had built the church if we did not see it.

The church priest immediately yielded and we explored the building to our satisfaction.

At Debra Tabor we called upon Ras Gougsa, the husband of the Empress, who for reasons of state is not allowed to come to Addis Ababa.

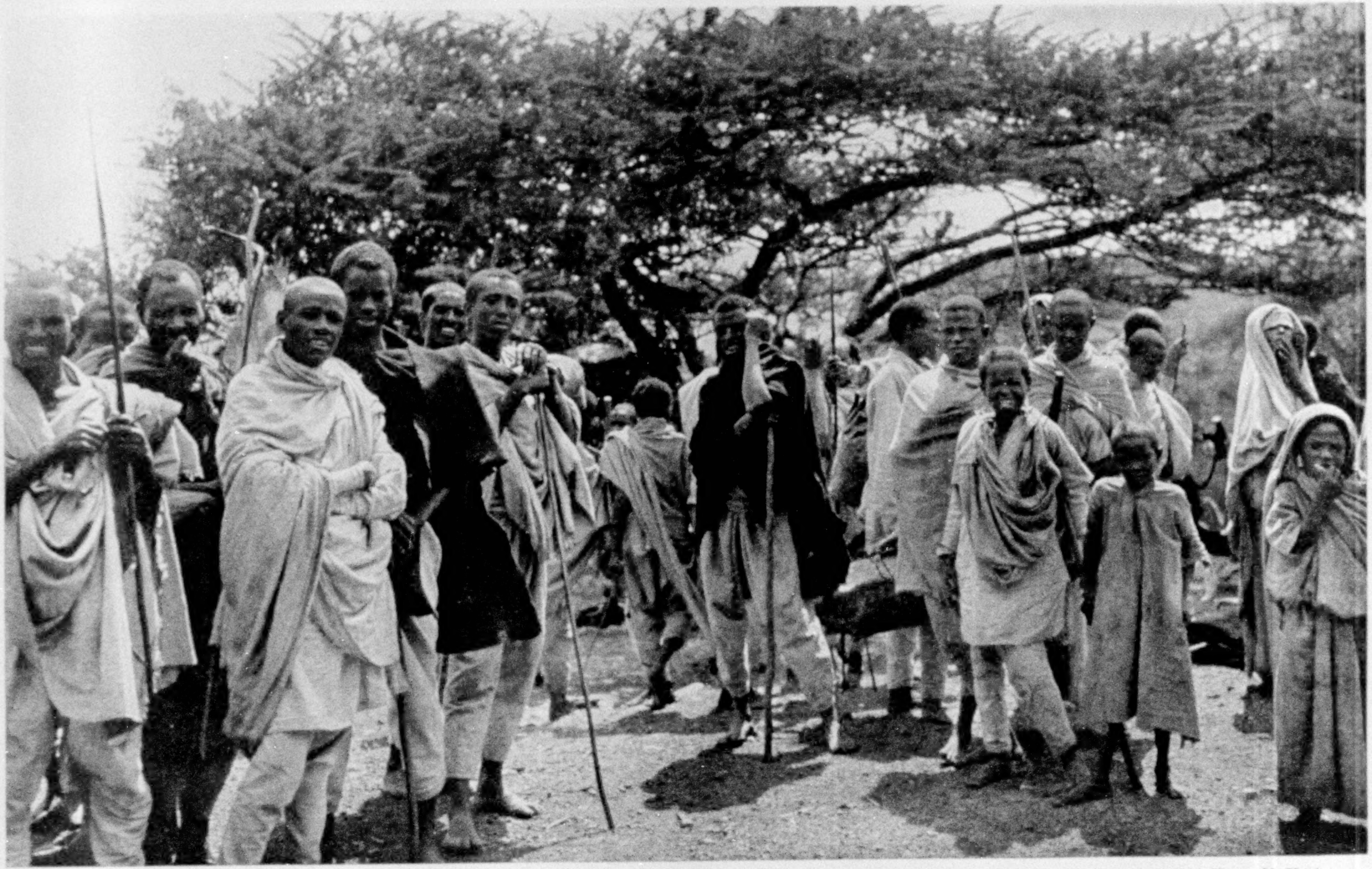
Soon after leaving this town we came in sight of Lake Tsana, the headwaters of the Blue Nile.

GONDAR HAS IMPOSING RUINS

Near the lake we first came upon remains of structures built by the Portuguese, who, after being established in Gondar for more than a hundred years, were expelled by Fasilidas in the years 1632 to 1635. During the time of their occupancy they built much and built well. We crossed bridges that had received no care in 300 years, but which were still structurally strong, despite the crumbled balustrades.

In Gondar itself we saw the only well-constructed buildings in Abyssinia, other than the monolithic churches. They had not been occupied for centuries, but some of them could even now be made habitable by replacing the burned floors and roofs.

XUM



Photograph by Harry V. Harlan

NATIVES TAKE AN INTEREST IN THE AUTHOR'S CAMERA

Over 70 per cent of the inhabitants of Abyssinia are bronze-skinned, but many of them believe that they are *the* white people, and allude to Europeans as "Red Faces." The distinctive feature of their dress is the *chamma*, a toga-like shawl draped over the shoulders and sometimes over the head to the eyebrow. The finest chammas are woven by hand from native cotton, edged with red or mixed with colored silks. The poorer classes use a length of cotton sheeting.

In one or two the beamed ceilings were still in place (see pages 659-660).

Gondar, now a village, must have been a great city in its prime. There is a vast area of tumbled stone overgrown with brush, where the less important personages lived, and there is another area of beautiful stone walls, remains of churches, monasteries, and the ruins of medieval castles, where the officials were housed. It is an imposing sight to look over these blocks and blocks of walls toward the larger castle, which still rears its towers against the sky hundreds of miles from navigable water or railhead.

It must have been a long journey from Portugal when the city was founded. The story of the actual construction is lost in the maze of nebulous tradition which surrounds all Abyssinian history, but whether or not the later buildings were constructed as palaces for kings after the Portuguese expulsion, the hardy Jesuit pioneers were responsible.

No Abyssinian mind conceived those buildings and no Abyssinian supervised their construction.

From Gondar we took the road to Gallabat, just over the border in the Sudan, by way of Chelga and Wahni.

Due to the sparse population, game was abundant, but we did not hunt except when meat was needed. As food, we much preferred birds, which were plentiful the whole distance. I bagged as many as eight guinea fowl with one shot of a 16-gauge shotgun. These birds were by far the most delicious meat we had, and we were able to obtain them easily except on the high plateau, where we ate partridge, wild duck, wild pigeon, and occasionally other birds we could not identify. We assumed that they were edible, and certainly Ferredja made them taste as if they were.

With the men of my caravan the situation was different. They required a greater meat supply, and when cattle and sheep were not available we shot game for them. The Christians could not eat meat of animals killed by the Mohammedans. The Mohammedans could not eat meat of animals killed by the Christians. Neither could eat game killed by Mr. Sewall or myself, unless they could reach it while it was still struggling and could cut its throat in the name of Mohammed or the Savior, as the case might be.

Often they had ample time, for neither of us was an infallible shot. Mr. Sewall had hunted very little, but killed most of the game toward the end of the trip.

Beyond Chelga, one day I sighted several very large water bucks and Mr. Sewall started after them. He brought one down at long range, but did not kill it, and exhausted his few cartridges while following it. One of the guards stole around a hill and shot the buck in the side. It is doubtful if the bullet from his homemade cartridge broke the skin.

Then my muleman decided that it was time the beast died. He was an enormous fellow—tall, thin, and as active as a cat. He drew his hunting knife, soon overtook the running buck, and stabbed it in the side. But big animals are hard to kill. The wounded creature whirled on its pursuer, but he evaded its horns and stabbed it again as it started to run. The performance was repeated time after time until the buck finally dropped. The Christians gorged themselves that night.

THE CARAVAN, AUGMENTED, REACHES GALLABAT

The day before we reached Gallabat all hands fell to and washed and scrubbed for the morrow. The next morning our caravan, managed by servants in spotless white, got under way.

The countryside felt the urge of a parade. Soldier after soldier joined our escort. They came flocking in from every side trail. By the time we reached Metemma, on the Abyssinian side of the boundary from Gallabat, we had all the appearance of an invading force. The natives under officers of Gallabat ran to their commanders, saying, "What shall we do? This man brings an army!"

How our hearts sank when we sighted the iron roofs of Gallabat! There was a telegraph line; a broad road ran up the hill; two days beyond by auto was a railroad—several days up the Nile from Cairo, it was true—but a railroad. Our caravanning was over.

XUM

BLACK-HEADED GULLS IN LONDON

By A. H. Hall

With Illustrations from Photographs by the Author

THE winter of 1894-95 was exceptionally severe in London, and some black-headed gulls (*Larus ridibundus*), driven to the haunts of man by the difficulty in obtaining food elsewhere, visited the Thames.

The inhabitants treated the birds kindly and fed them liberally, and in succeeding winters the visitors came back in increasing numbers.

In the early years of this century it was quite the vogue to go down to Westminster Bridge, the Embankment, and London Bridge, and purchase twopenny bags of sprats from itinerant venders, who did a flourishing business on fine days. The birds exhibited remarkable aptitude in catching the small fish in midair, and also evinced amazing audacity. I have even seen a man catch one of the gulls by the legs as it hovered, ready to take a sprat held in the fingers.

The gulls gradually increased in numbers, and not only frequented the Thames, where they are now to be found as far west as Windsor, but also invaded the ponds and open waters of the London parks. Flocks were to be seen in St. James Park, the Round Pond at Kensington, and elsewhere.

BIRDS NEGLECTED DURING THE WAR

During the World War the birds were somewhat neglected, but still continued to obtain a better living on the Thames than in wilder districts, though the ponds during this period were drained of water because they provided excellent landmarks, which enabled hostile aircraft definitely to determine their positions.

After the war these sheets of water were again restored, and the birds returned in great numbers. The workers in the city offices make a practice of keeping scraps and feeding the gulls at the luncheon hour, so that extraordinarily large flocks now succeed in obtaining an easy livelihood from October to March.

The gulls are so quick and bold that the ducks on the ornamental waters of the parks stand a poor chance of getting any of the doles provided by the strollers.

As a study in problems of flight, these birds on the wing are of unusual interest. Their remarkable control and the way several individuals will dash without a collision for the same morsel of food are sources of constant amusement and comment.

GULLS SHOW PARTIALITY FOR CHEESE

There are no supplies of sprats now readily available, and though, like all gulls, these birds are practically omnivorous, and eat with avidity the stale bread which is usually supplied, they show a marked partiality for cheese, being quite as eager for this as for fish.

Even when the gulls are feeding regularly, taking pieces of bread from the hand, a newcomer has only to appear with some lumps of cheese and the diners immediately desert their cereal repast and literally besiege the dispenser of their favorite morsels.

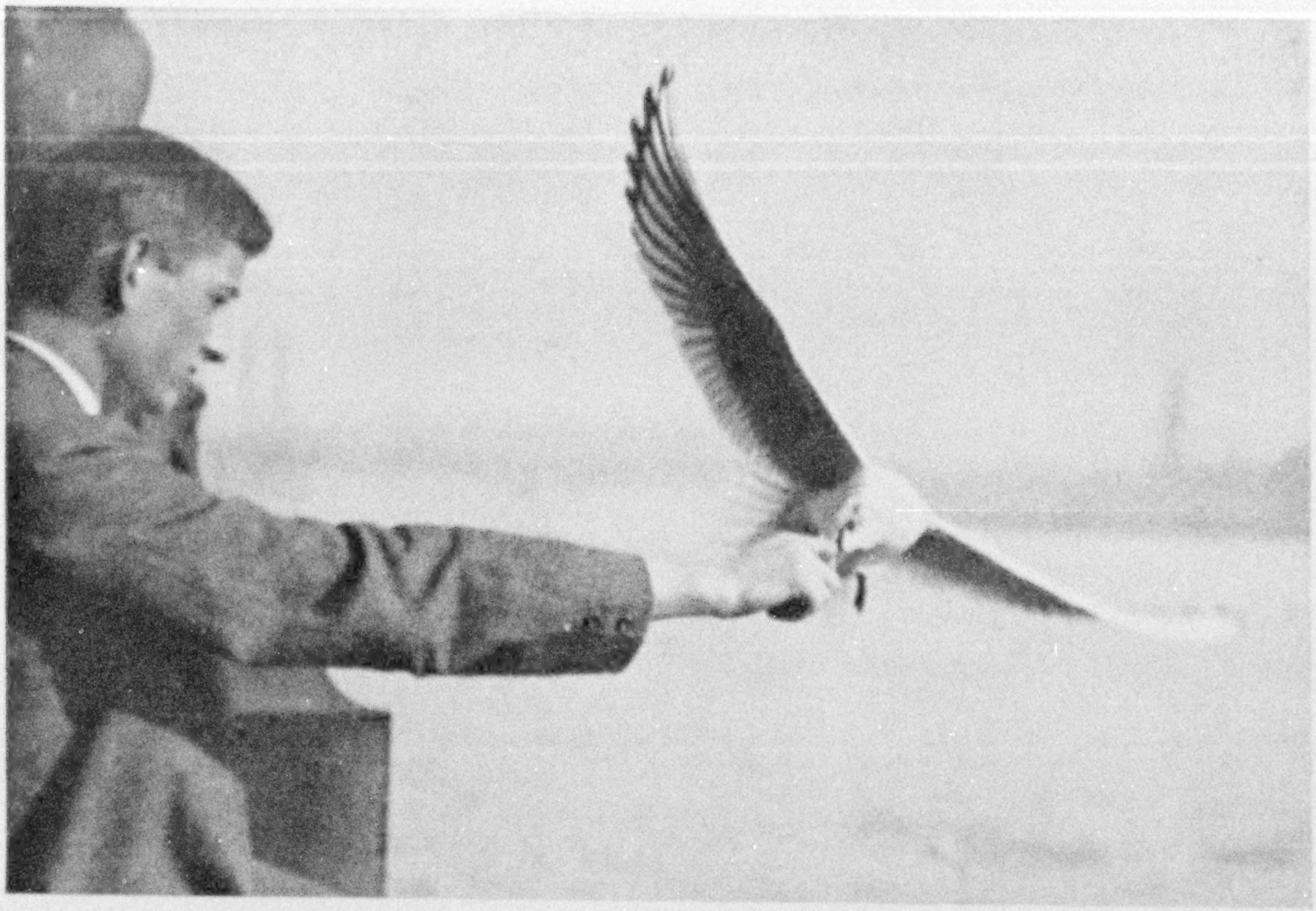
The birds vary greatly in boldness. Those which come first to the bait are attended by numbers of others, which flutter a few feet off and scream their disappointment at not getting the food also.

It is very noticeable what a difference a drop in temperature of a few degrees will make. One mild day will see the gulls greedy, but somewhat discreet; the next day, with a lower temperature, they will be absolutely ravenous, and I have on such occasions held lumps of cheese close to my face, when the gulls in taking the bait would fly near enough to brush my cheeks with their wings.

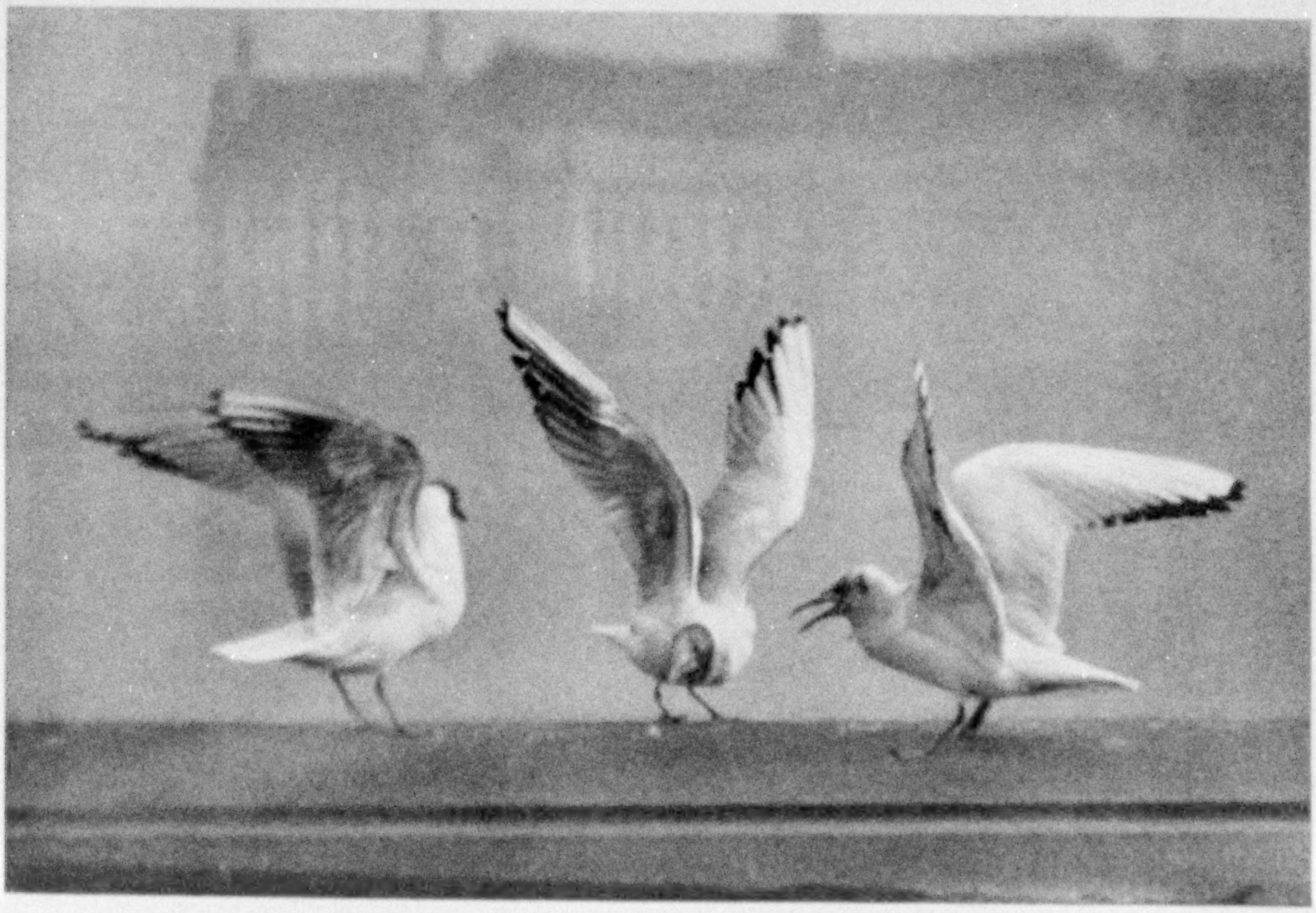
Hold out a piece of cheese in a small tin box, and, while great interest will be shown and much screaming will go on overhead, not one gull will venture to take a bite.

To photograph these birds in flight is entertaining, but very difficult. The fastest exposure is necessary, and when too many gulls come into the field of view, the picture is usually spoiled by confusion of detail.

It is worthy of note in the accompanying illustrations, pages 665 to 672, that many of the postures are very different from the conventional attitudes depicted by artists.



ACCEPTING A TITBIT FROM THE HAND OF A FRIEND



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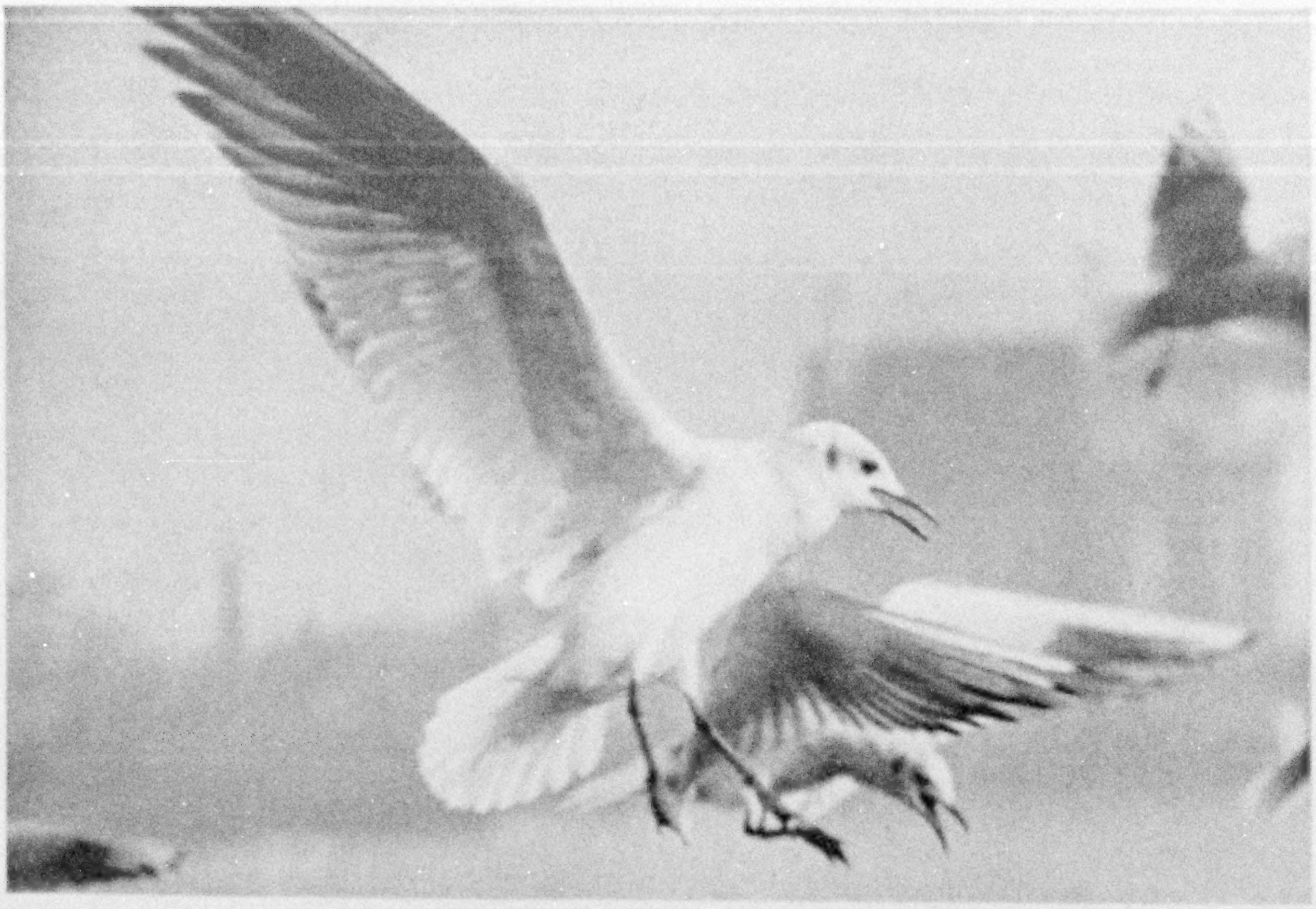
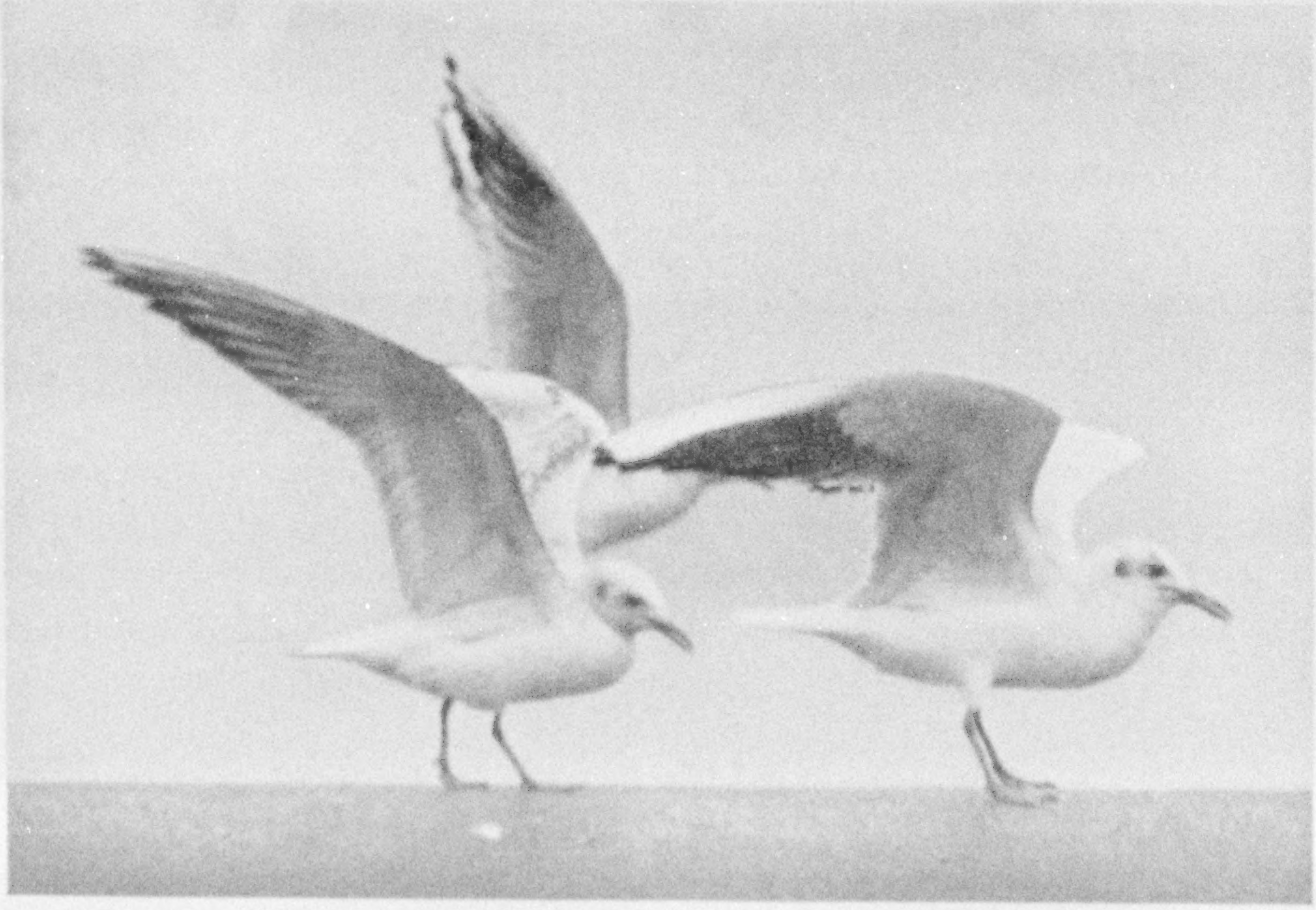
WITH PINIONS RAISED: THREE BLACK-HEADED GULLS ON THE THAMES EMBANKMENT, LONDON



A NECK AND NECK RACE FOR A MORSEL TOSSED IN AIR



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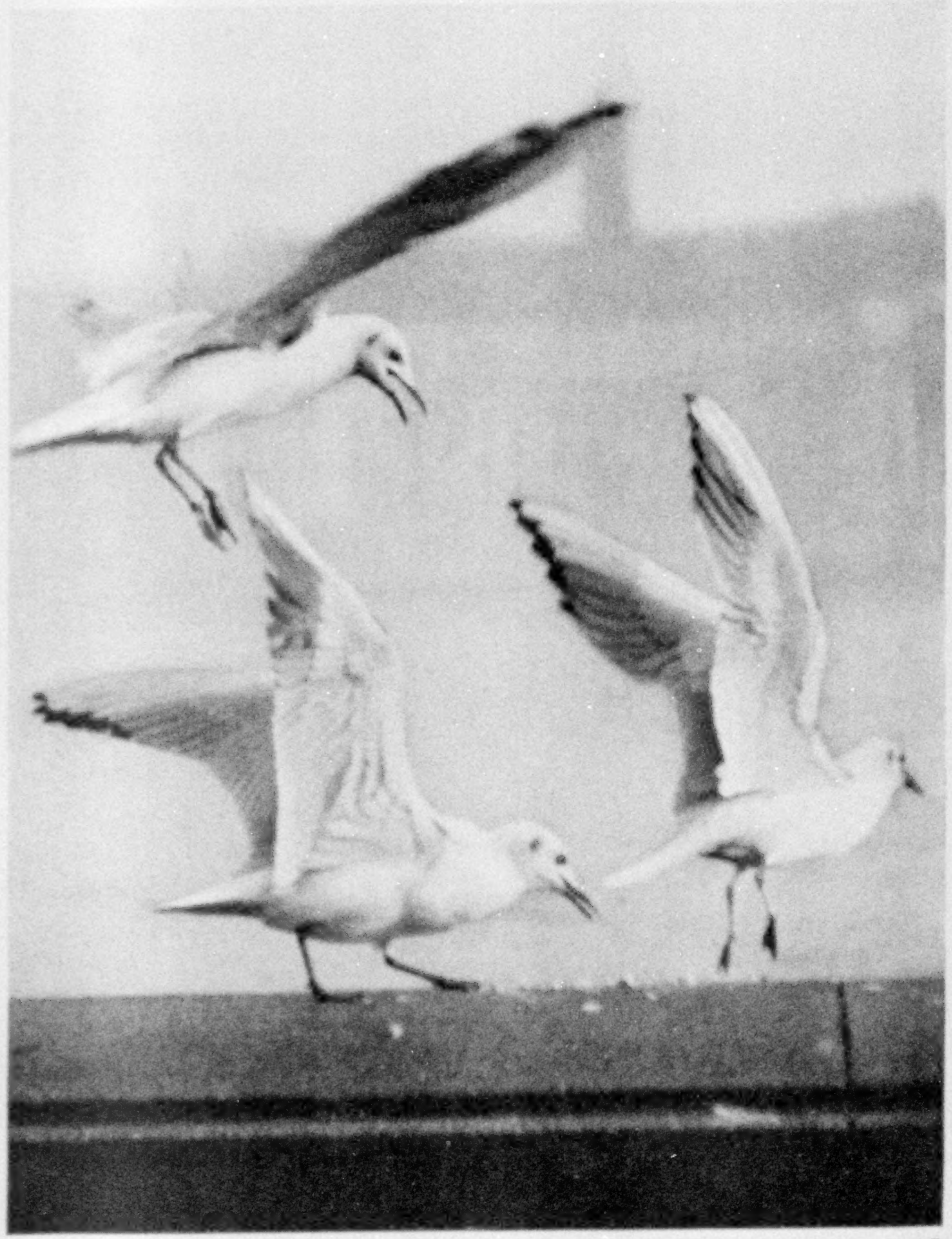
AËRIAL VISITORS WINTERING IN LONDON

A HELICOPTER EFFECT: A GULL HALTING TO SEIZE A BEAKFUL

© A. H. Hall

PHOTOGRAPH MADE WITH A THOUSANDTH OF A SECOND EXPOSURE



GOING INTO ACTION

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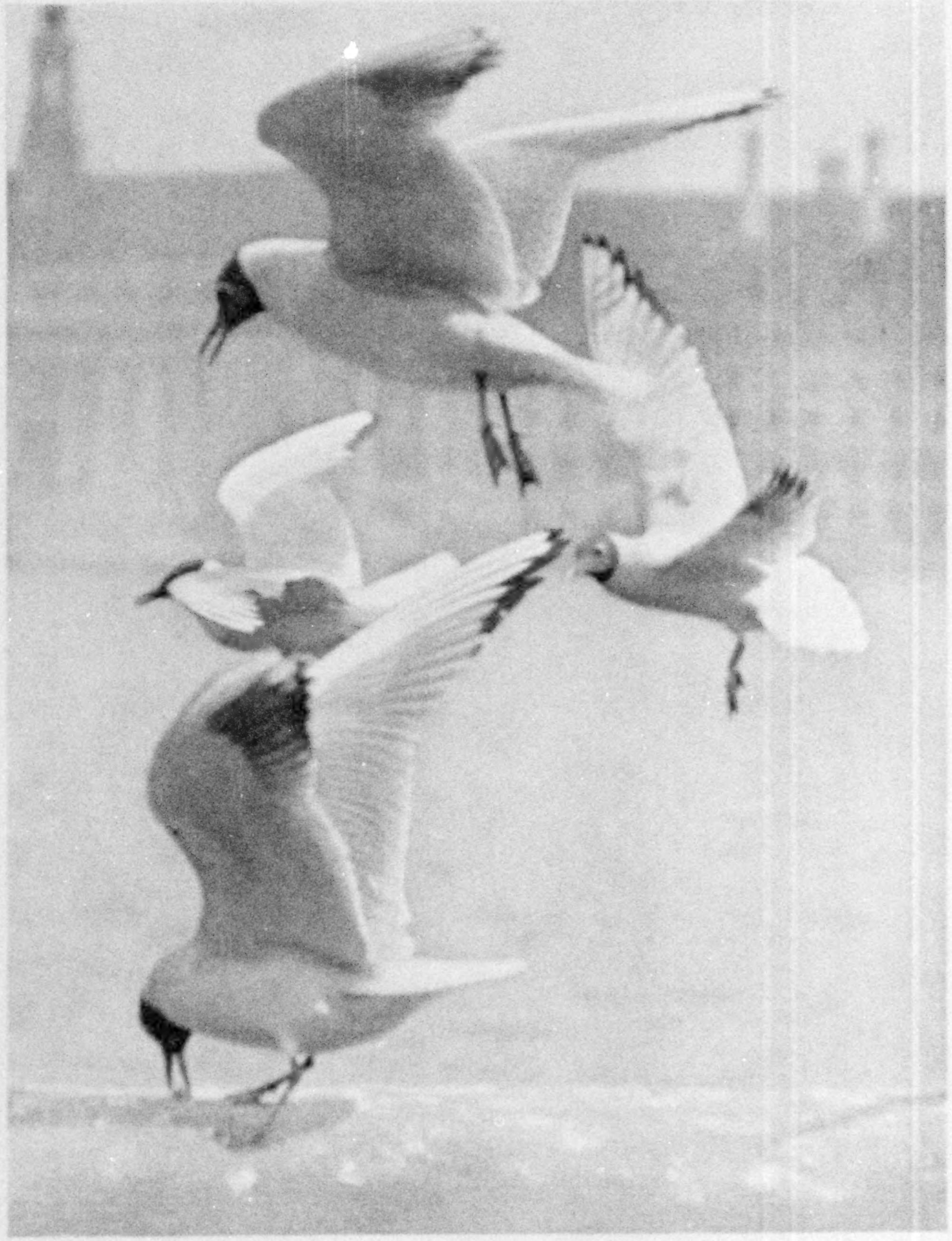
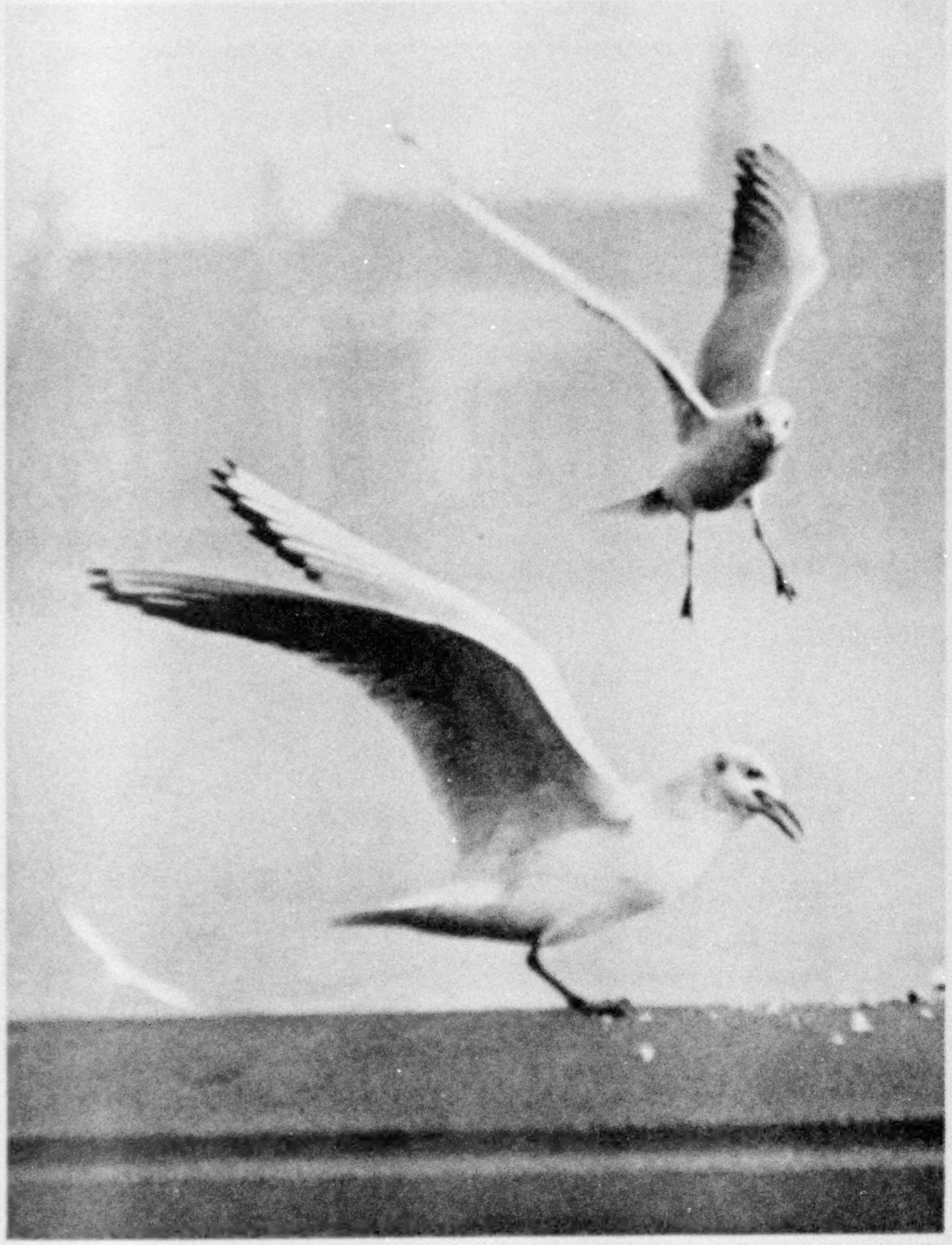


FIRST COME, FIRST SERVED



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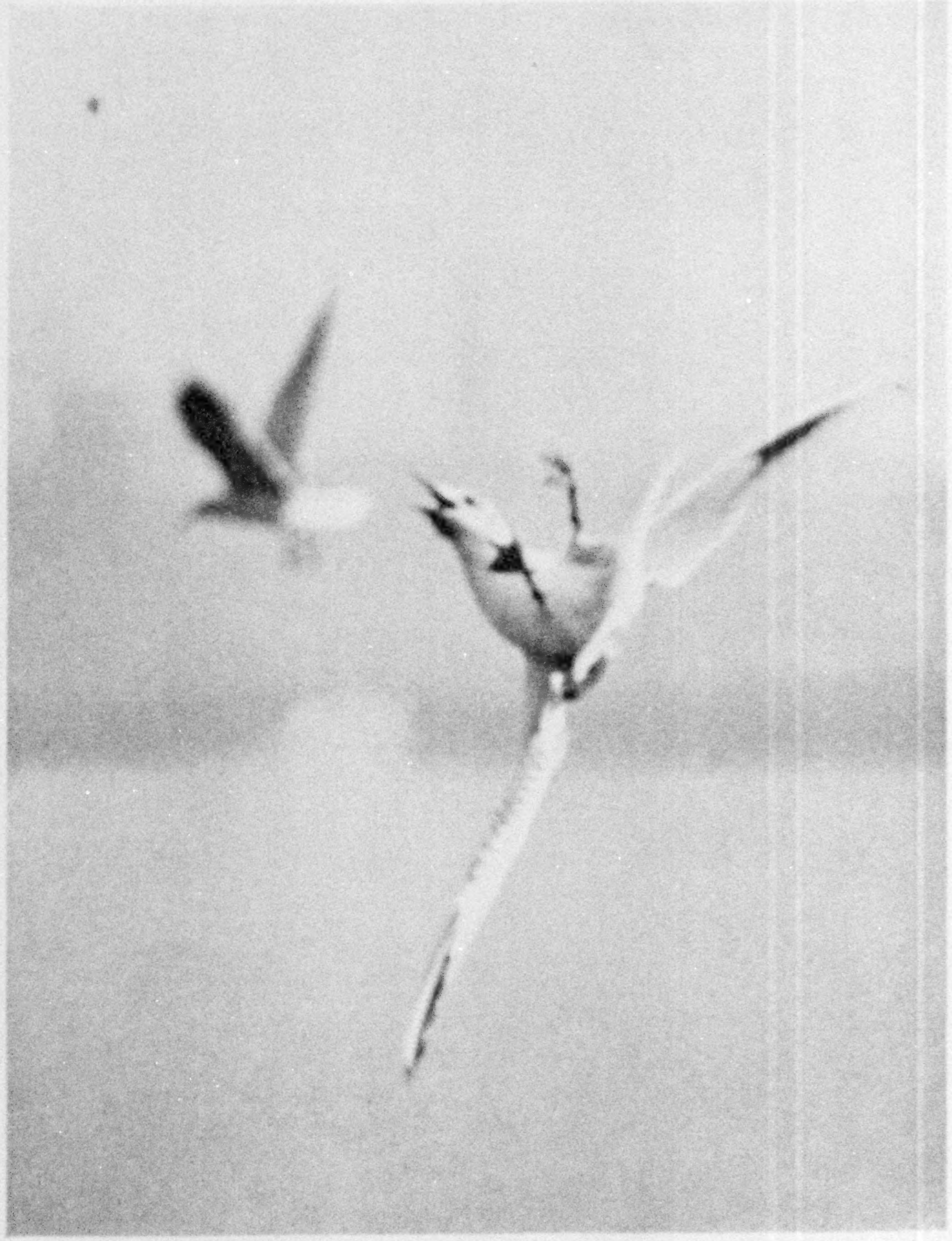
LATE FOR THE FEAST

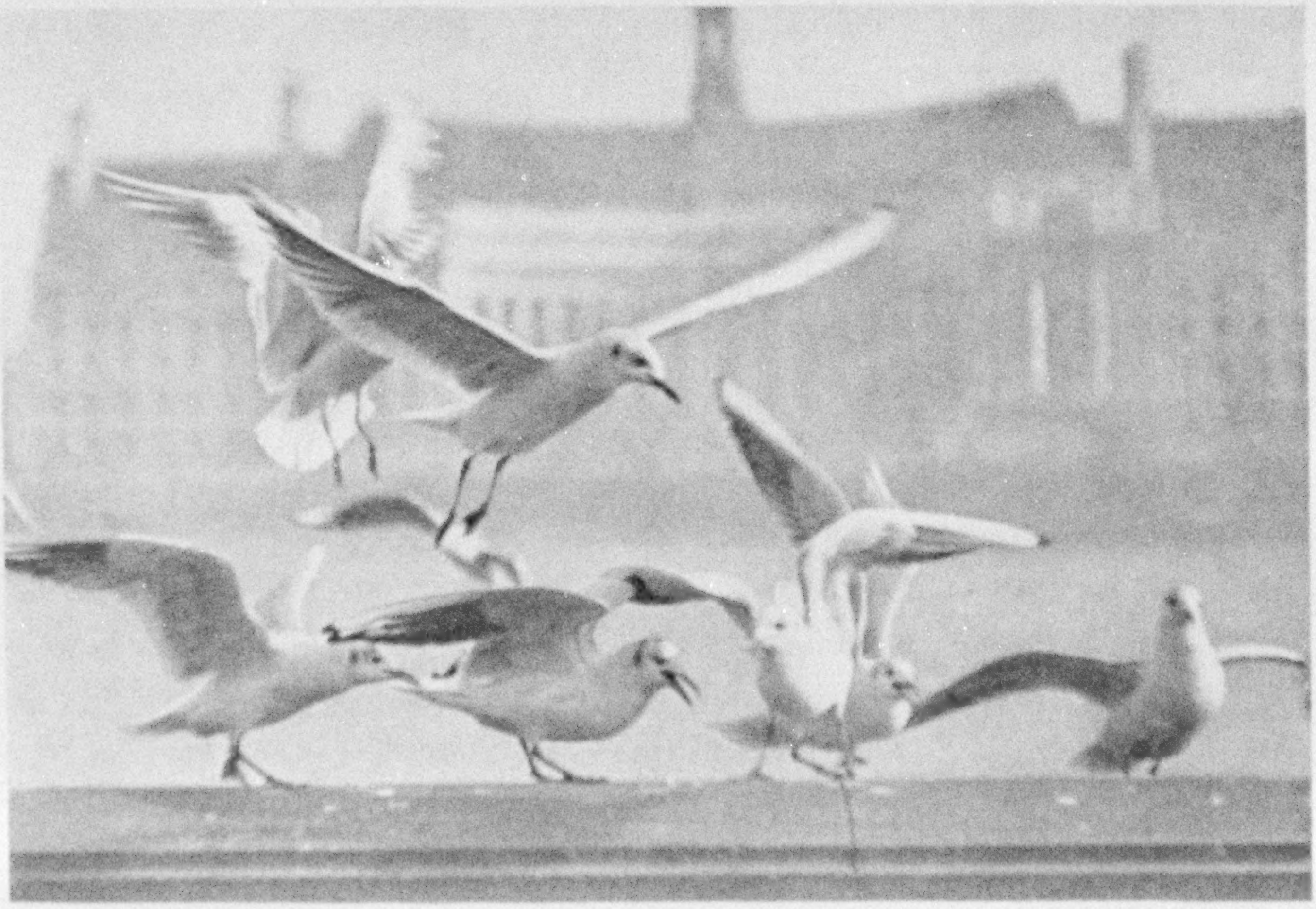
The bird which has alighted is beginning to show the dark chocolate head-feathers, the breeding plumage from which it derives its name.



A SOMERSAULT IN MID AIR

The gull in the foreground has missed the bit of cheese (seen in the upper left corner) and is reversing himself in full flight.

A STUDY IN AËRONAUTICS



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A FOOD QUEUE ON THE PARAPET OF THE THAMES EMBANKMENT

TOURNAMENT FLYING

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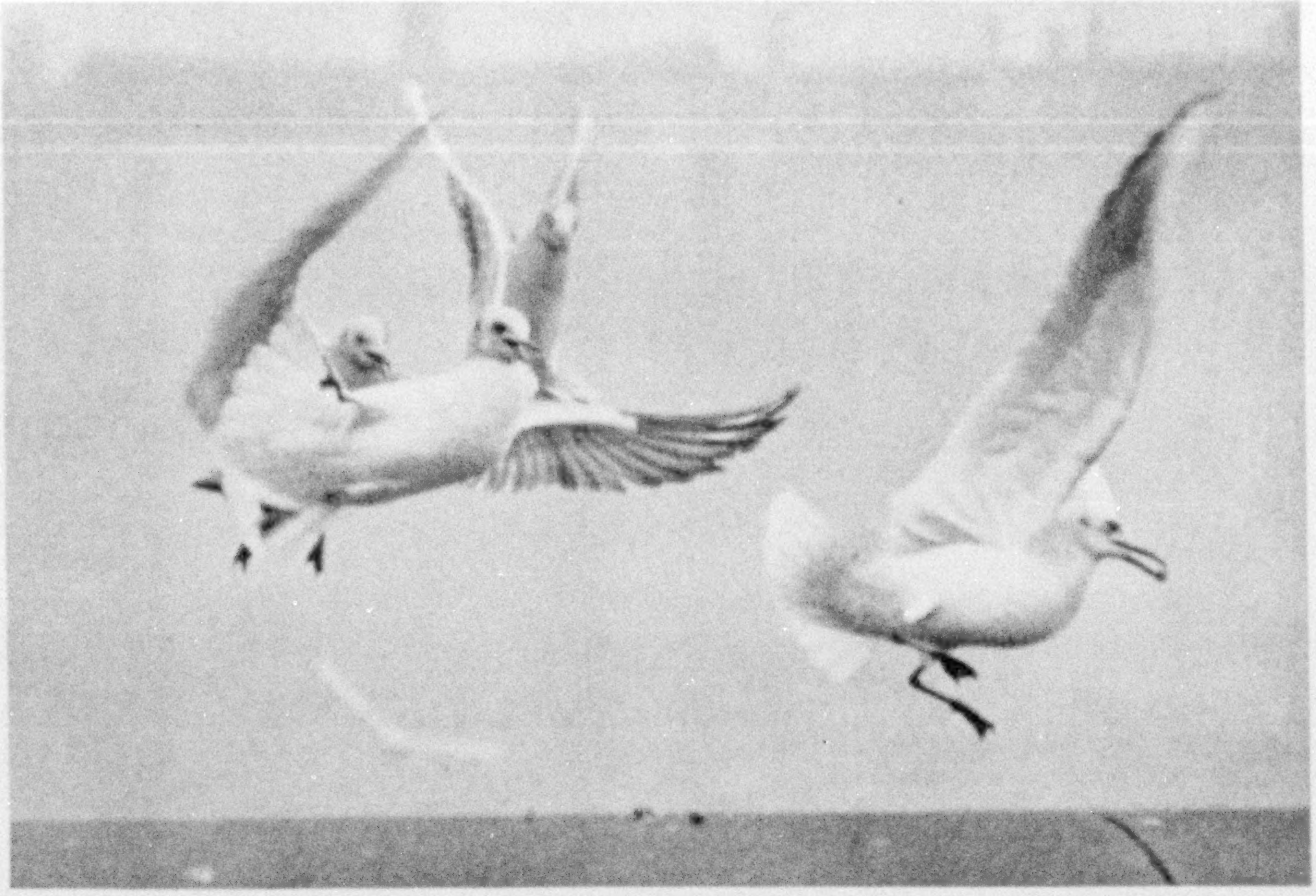
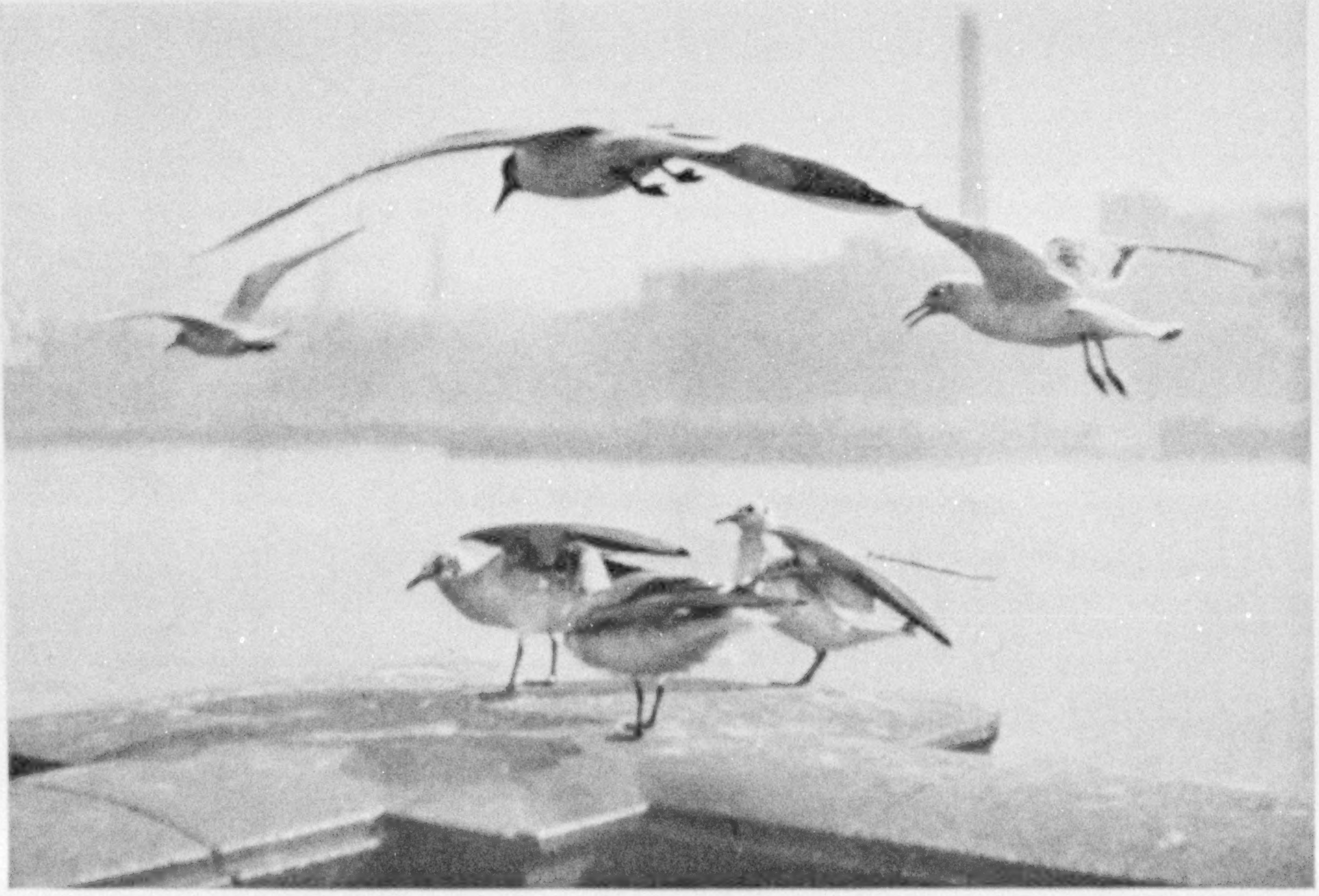
UNCONVENTIONAL ATTITUDES: WING POSTURES NEVER SEEN IN ART



IN HOT PURSUIT: NOTE HOW THE PURSUED BIRD IS "BANKING HIS TURN"



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BIRD OF THE BROAD AND SWEEPING WING

The black-headed gulls usually leave the Thames by the end of March and go to their nesting haunts at Scoulton Mere in Norfolk, at various places in Lancashire, and farther north.

TO SEEK THE UNKNOWN IN THE ARCTIC

United States Navy Flyers to Aid MacMillan Expedition Under the Auspices of the National Geographic Society in Exploring Vast Area

WITHIN a few days of the time when this number of their Magazine reaches the members, an Arctic expedition under the auspices of the National Geographic Society will sail from Wiscasset, Maine, for Etah, Greenland. During the summer months it is hoped that many thousand square miles of hitherto-unexplored area north of Beaufort Sea will be revealed to the world by geographers bearing the Stars and Stripes.

With the approval of President Coolidge and the Hon. Curtis D. Wilbur, Secretary of the Navy, this work is to be undertaken by the MacMillan Arctic Expedition, with the coöperation of the United States Navy. The Board of Trustees of the National Geographic Society has appropriated $40,000 from the Research Fund to aid in defraying the expenses. The leader, Donald B. MacMillan, well known to members of The Society, has been active in Arctic exploration since 1908, when he was one of Peary's lieutenants on the expedition which resulted in the attainment of the North Pole, April 6, 1909.

The MacMillan party will go north on two ships—the *Peary*, a converted French trawler, and the *Bowdoin,* a staunch craft which has already written its name large in Arctic exploration, having carried Commander MacMillan to the Far North on two previous expeditions.

By invitation of the city of Boston, the vessels will sail from that port for Wiscasset on June 17, Bunker Hill Day.

The trawler *Peary* will be used primarily to transport the United States Navy's recently perfected Loening amphibian airplanes, capable of landing both on the water and on the ice. The operation of the planes and Navy personnel will be under the direction of Lieutenant Commander R. E. Byrd, U. S. N.

The Navy is holding in readiness its two great airships, the *Shenandoah* and the *Los Angeles,* to send to the relief of the expedition should it encounter unforeseen difficulties.

MANY BRANCHES OF SCIENCE TO BE REPRESENTED

On board the *Bowdoin* will be a group of distinguished scientists, including an ichthyologist, a geologist, and a meteorologist. Among the tasks of the first named will be the study of several kinds of salmon and trout.

The meteorologist will be an especially important member of the party, as a study of atmospheric conditions at various altitudes can be made with the aid of the Navy planes. His work will prove of value for the future, if commercial air lanes are established over Arctic regions, in flights from England and Newfoundland to Japan. Data may also be obtained which will aid in weather forecasting for the United States.

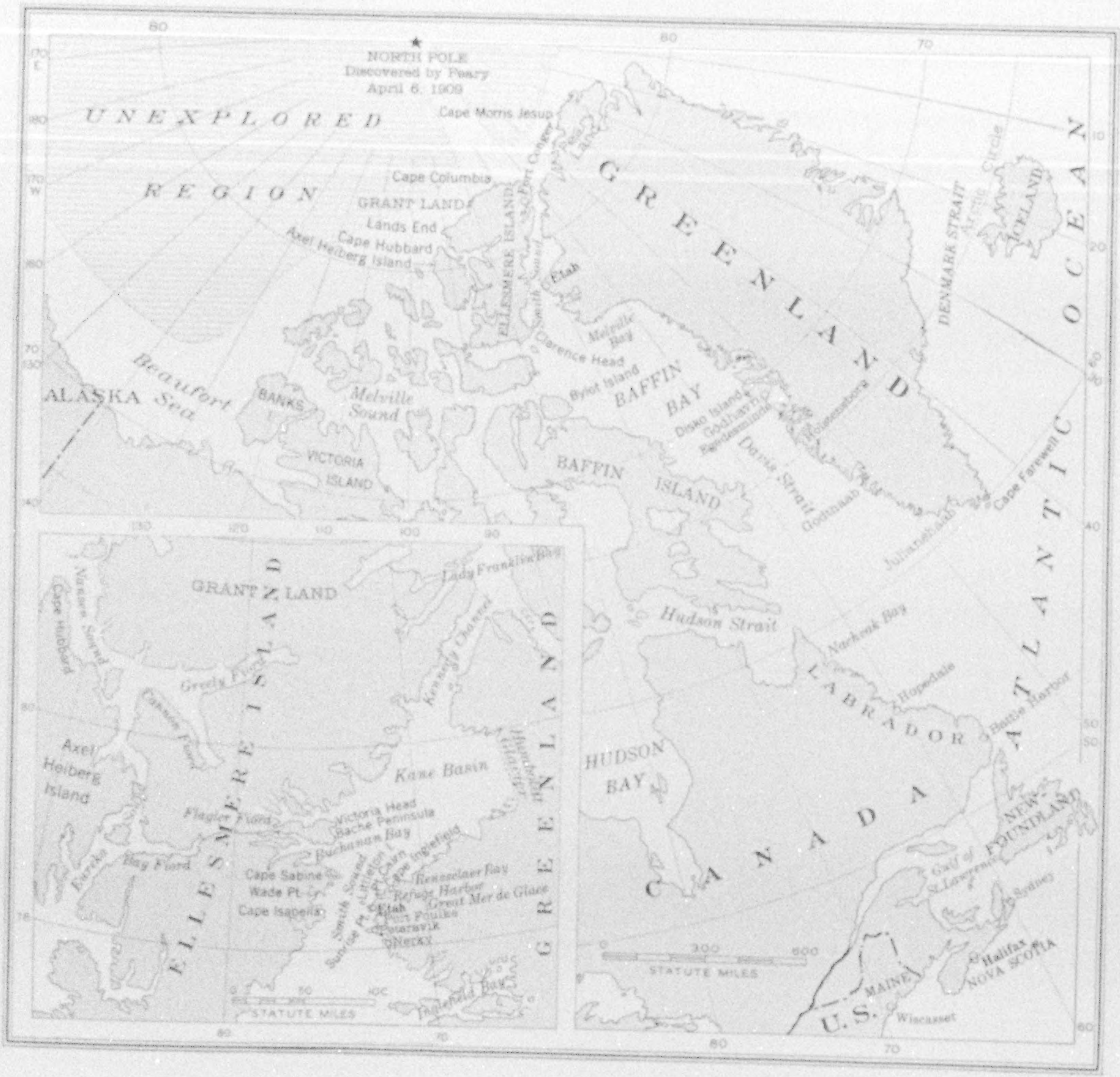
The unexplored area, which it is hoped can be penetrated by means of airplanes, with bases established on Axel Heiberg Island, lies between the Alaska Peninsula and the North Pole, and is shown on maps and globes by a white spot representing approximately one million square miles of the earth's surface.

Other unknown areas where explorations will be made include central Ellesmere Island and Grant Land, the northern part of the great Greenland ice cap, the northern part of Labrador, and the entire interior of Baffin Island, believed to be a land of thousands of lakes and bountiful animal and bird life (see map, page 674).

The headquarters of the expedition will be established at Etah. From this base gasoline and other supplies can be relayed to Cape Thomas Hubbard, Axel Heiberg Island, at the edge of the Polar Sea, for the use of the Navy's amphibian aircraft.

From Cape Hubbard to the center of the great unknown area is, roughly, 600 miles—a distance which could be accomplished by an airplane having a cruising

XUM


NORTH POLE
Discovered by Peary
April 6, 1909
UNEXPLORED
REGION
Cape Morris Jesup
Cape Columbia
GRANT LAND
Lands End
Cape Hubbard
Axel Heiberg Island
ELLESMERE ISLAND
Etah
GREENLAND
Melville Bay
Clarence Head
Bylot Island
BAFFIN BAY
Disko Island
Godthaab
Davis Strait
Julianehaab
Cape Farewell
DENMARK STRAIT
Arctic Circle
ICELAND
ATLANTIC OCEAN
Beaufort Sea
ALASKA
BANKS
Melville Sound
VICTORIA ISLAND
BAFFIN ISLAND
Hudson Strait
HUDSON BAY
Nachvak Bay
LABRADOR
Hopedale
Battle Harbor
CANADA
NEWFOUNDLAND
Gulf of St. Lawrence
Sydney
Halifax
NOVA SCOTIA
MAINE
U.S.
Wiscasset
STATUTE MILES
GRANT LAND
Lady Franklin Bay
Kennedy Channel
Greely Fiord
Cannon Fiord
Axel Heiberg Island
Kane Basin
Flagler Fiord
Victoria Head
Bache Peninsula
Buchanan Bay
Cape Sabine
Wade Pt.
Cape Isabella
Smith Sound
Rensselaer Bay
Refuge Harbor
Great Mer de Glace
Etah
Port Foulke
Netarsvik
Inglefield Bay
Bay Fiord
ELLESMERE ISLAND
GREENLAND
STATUTE MILES

MAP SHOWING FIELD OF ACTIVITY OF THE MAC MILLAN ARCTIC EXPEDITION UNDER THE AUSPICES OF THE NATIONAL GEOGRAPHIC SOCIETY

The *Peary* and the *Bowdoin* will sail from Wiscasset, Maine, for Etah, Greenland, touching en route at Sydney, Nova Scotia, and Hopedale, Labrador. The main ship base will be established at Etah, and an airplane base will be established at Cape Thomas Hubbard, Axel Heiberg Island. From the latter it is hoped that the amphibian U. S. Navy planes can fly over much of the unexplored area lying between Alaska and the North Pole. Other objects of the expedition will be to explore by plane the great ice cap of northern Greenland, the interior of Baffin Island, and a portion of north-central Labrador.

radius of 1,200 miles. It is hoped that by the use of extra fuel tanks the amphibian planes can cover this distance in one continuous flight.

DENMARK CONSENTS TO STUDY OF NORSE RUINS

Through the courtesy of the Government of Denmark, to whom the entire Island of Greenland belongs, the MacMillan party will be permitted to study the remains of old Norse settlements established in the southern portion of the island some 1,500 years ago. It is estimated that there are 100 farms of early Norsemen and some stone churches near Julianehaab, and some 90 farms and 24 stone churches built by the Norsemen in the vicinity of Godthaab. The reason for visiting and studying these ruins is to establish, if possible, a connection between the houses built by the Norsemen and those that have been found in Labrador, which, according to the Eskimos, were built by "strange people, who came in from the sea in open boats without masts and without sails."

THE LEADER OF THE MAC MILLAN ARCTIC EXPEDITION

The commander is rather successfully disguised by his snow goggles. He has in his arms three young eider ducks taken on Littleton Island, near Etah, Greenland, last July.

Commander MacMillan will report all findings of the expedition by radio in telegraphic code to the National Geographic Society, and the news will be given immediately to the world through the daily press by The Society. In receiving the code messages from the Far North, the coöperation of American radio amateurs will be relied upon.

WILL MAKE ATTEMPT TO BROADCAST TALKS FROM THE ARCTIC

Effort will be made to have the spoken word from the expedition leader broadcast to American homes. The transmission of the radio messages, during the 24 daylight hours, across a hitherto "dead zone," by the new short wave-lengths, will constitute in itself an experiment in communication of scientific value.

Of special interest to all of the members of the National Geographic Society, each of whom has a share in the financial support of the expedition, will be the provisions which are being made for photographing the wonders of the Far North. For the first time in Arctic exploration, natural-color photographs will be made. It is believed that these color plates of the marine life, the flora, including the beautiful "red snow," and of the experiments to record photographically the Northern Lights will prove valuable contributions to science.

Commander MacMillan's detailed account of the work of the expedition will appear in the NATIONAL GEOGRAPHIC MAGAZINE shortly after the leader's return to civilization.

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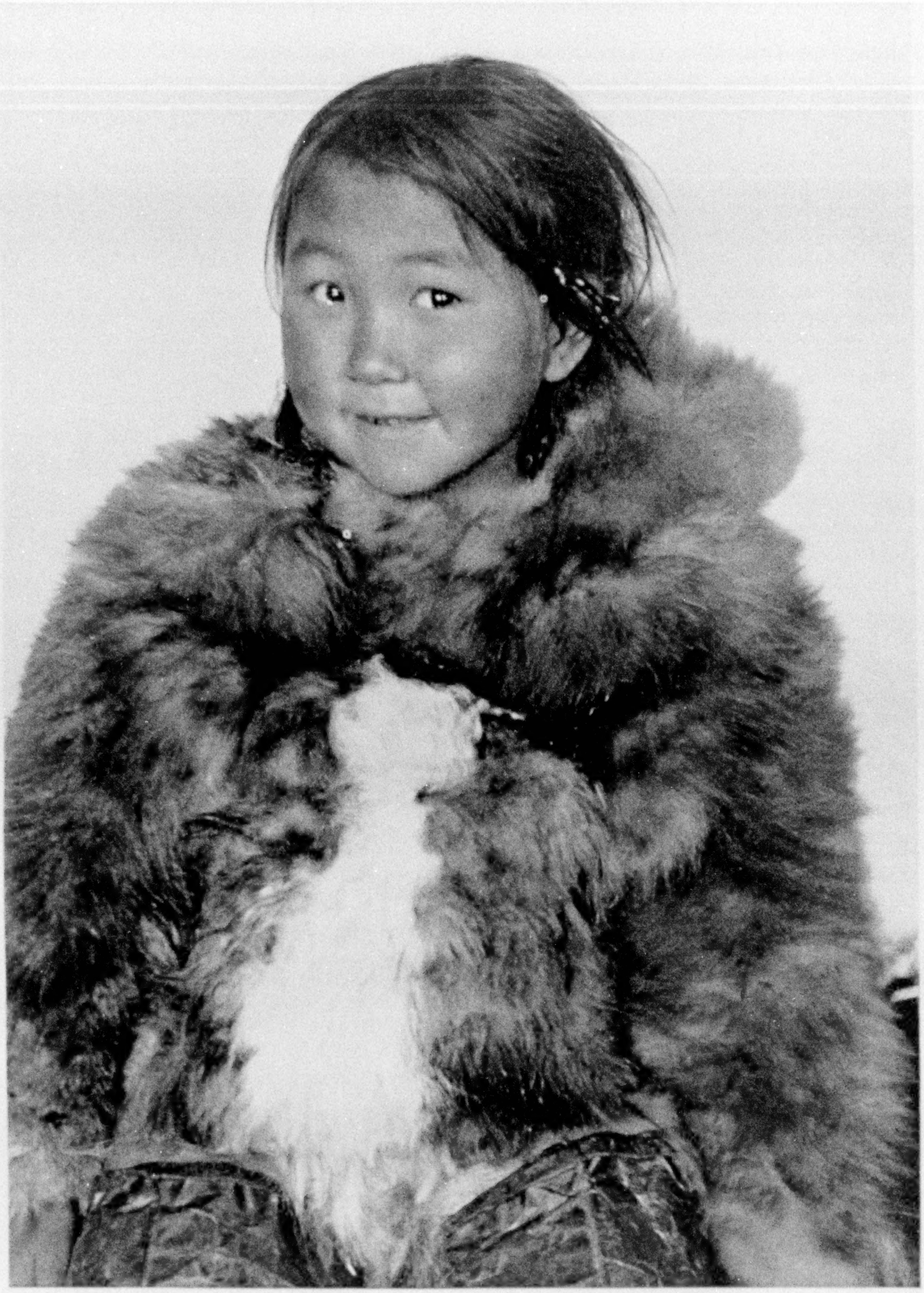


Photograph by Donald B. MacMillan

EIGHT-YEAR-OLD ME-GISH-OO, OF NORTH GREENLAND

The present native population of Greenland is about 14,000 and is mostly confined to the west coast. Little Me-gish-oo shows the friendly, happy characteristics of her people (see also page 718). One of the objects of the MacMillan Arctic Expedition under the auspices of the National Geographic Society is to make a study of the Smith Sound Eskimos, to which tribe this girl belongs.

THE "BOWDOIN" IN NORTH GREENLAND

Arctic Explorers Place Tablet to Commemorate Sacrifices of the Lady Franklin Bay Expedition

By Donald B. MacMillan

Leader of the MacMillan Arctic Expedition, under the Auspices of the National Geographic Society, 1925; Author of "Peary as a Leader," in the National Geographic Magazine

ONE of the objectives of the *Bowdoin* on the Arctic Expedition of 1923-1924 was Cape Sabine, on the eastern shore of Ellesmere Island, where, at the request of the members and Board of Trustees of the National Geographic Society, we were to place a tablet in memory of the members of the Lady Franklin Bay Expedition who died there of starvation in the spring of 1884.

The *Bowdoin*, named after my college, was built on the Maine coast especially for Arctic work. Although the smallest vessel ever to go into the Far North, she is undoubtedly one of the strongest, having been built of well-seasoned timber, oak-ribbed, oak-planked, covered with a five-foot encircling belt of ironwood, and a 1,700-pound steel plate on her stem to take the brunt of her battle with ice floes.

THE EXPEDITION REACHES ETAH

We sailed from Wiscasset, Maine, June 23, 1923, and after a voyage of numerous minor adventures, the *Bowdoin* rounded Cape Alexander and sighted Etah at midnight of August 7, with the sun bathing every promontory and ice cap in a soft yellow light.

The bold north shore, with its gentle green slope culminating in its 1,000-foot cliff, was beautiful, with its blues, greens, purples, and reds blending into the pattern of a gigantic oriental rug.

The waters of the fiord, placid as a mirror, reflected the contour of the bordering hills, strikingly black in contrast with the gleaming white of the glacier crowning the head of Etah harbor and dropping gently into the clear waters of Alida Lake.

The hush of midnight, which steals quietly over the Northland as the sun swings along the northern horizon, was broken only by the musical sound of falling waters.

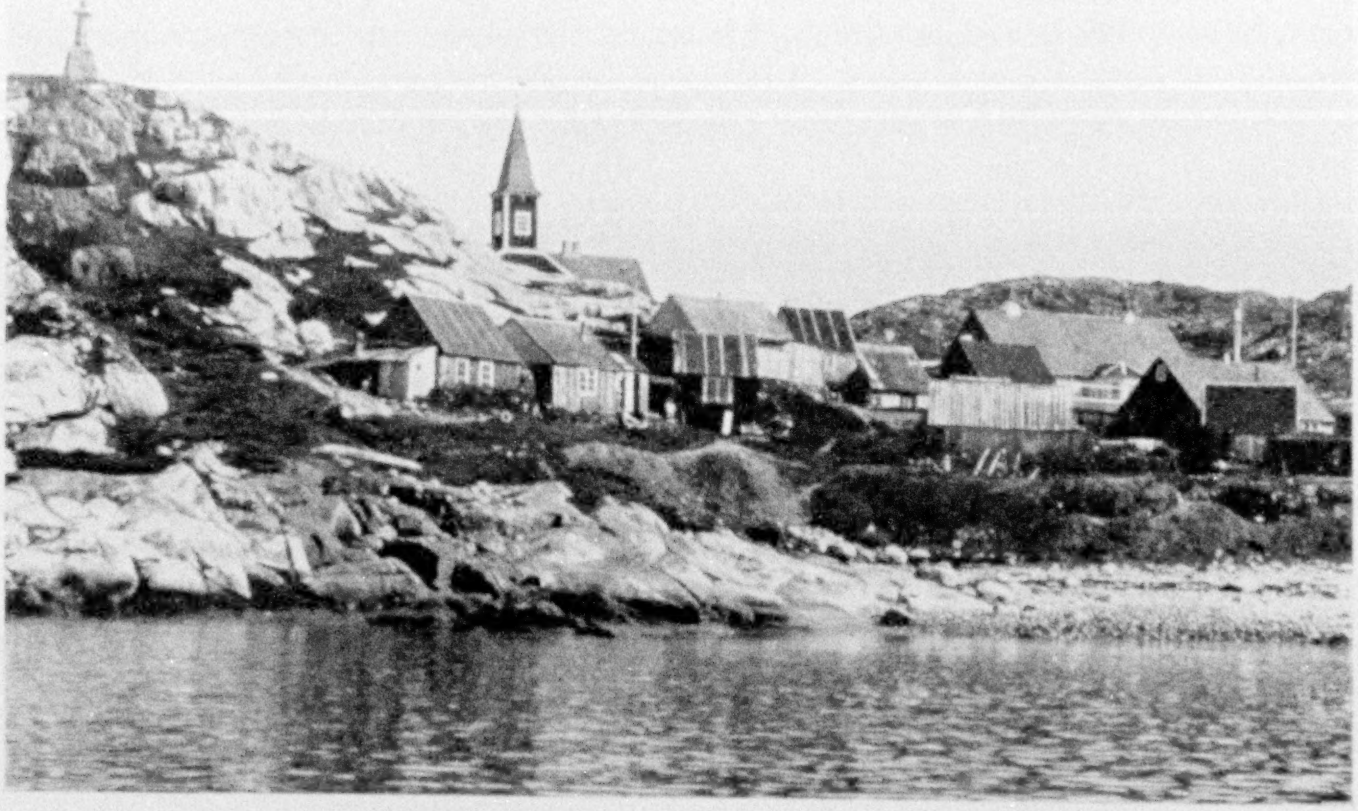
One point alone was not attractive, the site of our home of 1913-1917. It seemed so strange, so unreal, to look up and find it gone! Thirty-five feet square, eight rooms, a large, comfortable living room, four bedrooms, a carpenter shop, generator room, dark room, all electrically lighted, with double windows, double walls—a real home to welcome us back from long, cold trips—now a flat, débris-covered slope, "a tragical vista of pathetic scraps."

The morning after our arrival we left Etah for Cape Sabine, 30 miles distant. There was not a particle of ice in sight from the crow's nest. Open water extended apparently to the Pole itself. When within 10 miles of Cape Sabine, however, ice seemed fairly to pop up out of the sea, and lay in one solid jam against Ellesmere Island from Cape Isabella northward. This disappearance and reappearance of drift ice is so astonishing that Newfoundland fishermen declare that it rises from the bottom and sinks beneath the surface.

Running along its edge, we examined the drift ice carefully for open water; it presented an unbroken front. I decided to return to Etah and await a more favorable opportunity to erect the memorial.

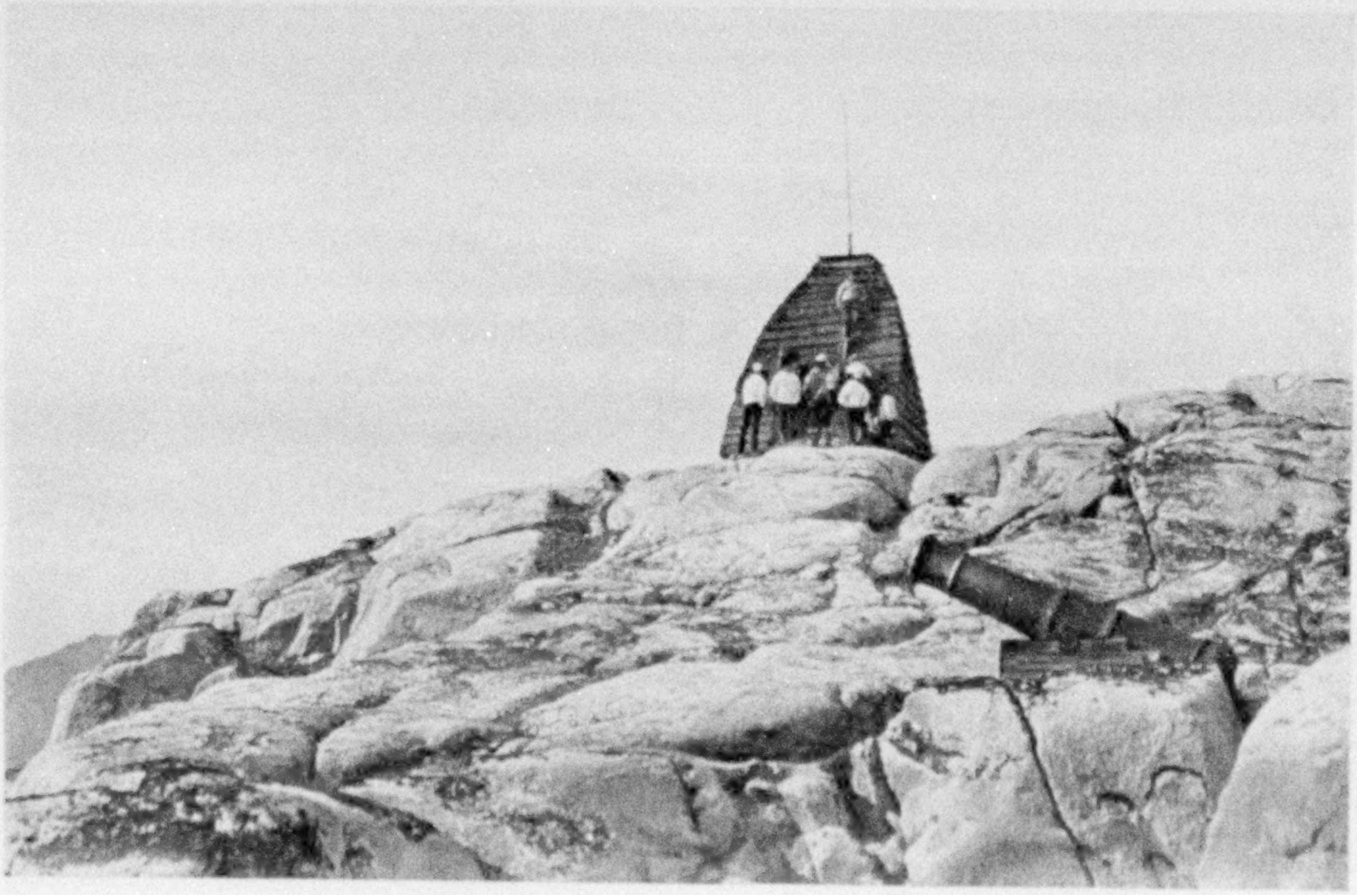
THE TRAGIC STORY OF THE GREELY PARTY AT CAPE SABINE

Upon the northern side of Cape Sabine is the site of the Greely Camp of 1883-84. The 23 officers and enlisted men of the Lady Franklin Bay Expedition, with two Eskimos, under command of Lieutenant Adolphus W. Greely, landed at Wade Point, 16 miles southwest of Cape Sabine, following their memorable retreat in boats from Fort Conger, 220 miles north. It was here that they fully expected to meet the relief ship sent by the United States Government.



GODTHAAB, CAPITAL OF SOUTHERN GREENLAND

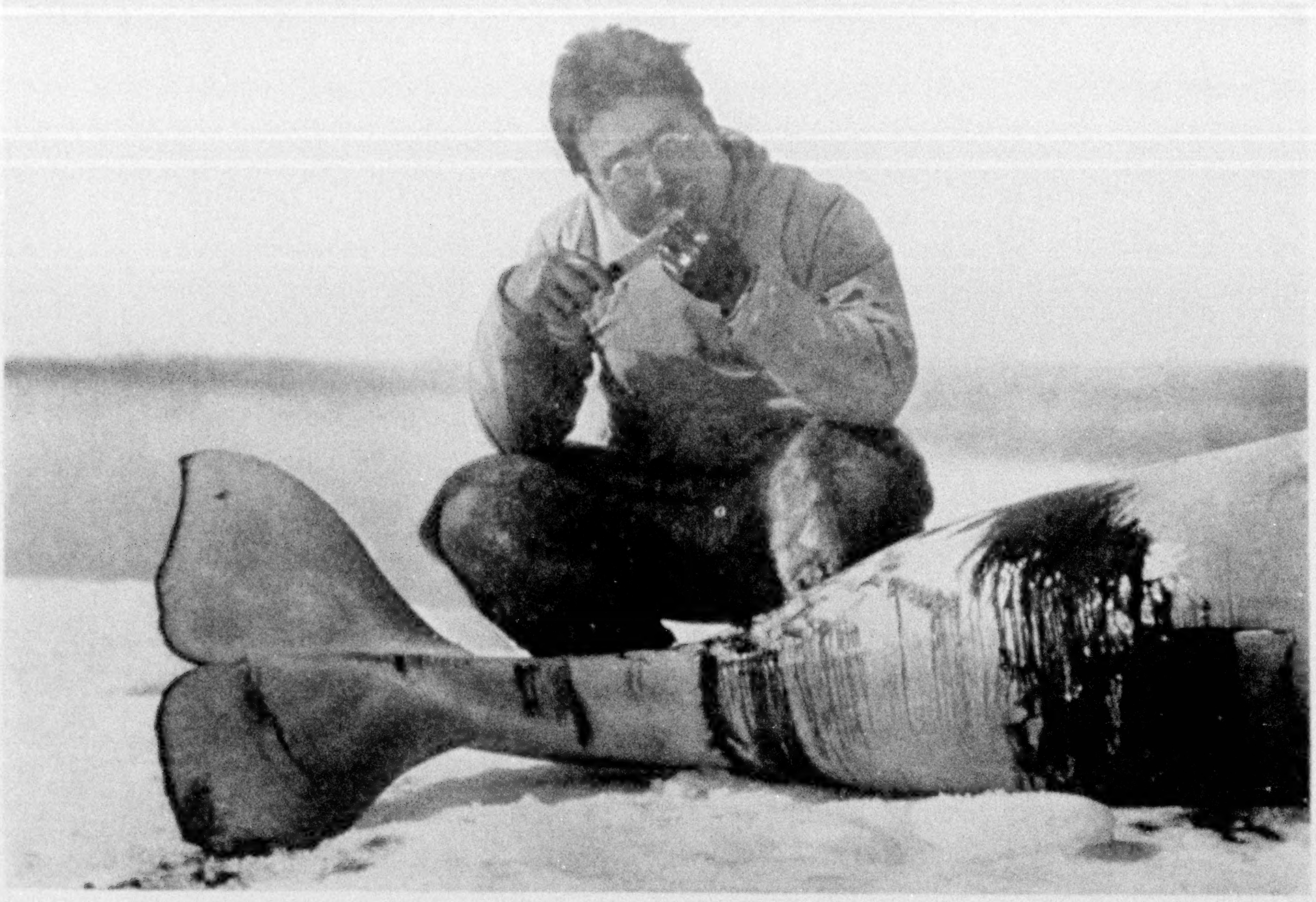
This tiny "metropolis" has about 400 inhabitants and more modern buildings than most of the other settlements of the Danish colony.



Photographs by Donald B. MacMillan

THE WHALER'S LOOKOUT AT GODHAVN: DISKO ISLAND

This curious relic of 1782 is made of boards nailed to four large pieces of whale jaw. Seamen and explorers have cut their names on the hut's walls, and some of the dates go back to 1811. The cannon in the foreground was used to announce to the fleet the sighting of a whale or the rupture of the ice pack. Godhavn, the Lievely of English and Scotch whalemen, is the capital of the North Greenland Inspectorate. In its harbor almost all American Arctic expeditions, and many British, have anchored.



Photograph by Donald B. MacMillan

KOO-KA-PING-WA EATING RAW WHITE WHALE MEAT

This flesh is a great delicacy to the Smith Sound Eskimo, while the oil, like that of the narwhal, is used for heating and lighting purposes.

A note left in a cairn at Cape Sabine advised the explorers that this relief ship had been crushed in the ice, but a cache of supplies had been landed. The party decided to abandon their partially constructed quarters at Wade Point to settle beside the cache, where a second ship would naturally seek them.

Then began a long and hopeless fight against cold, darkness, and starvation. When the sun first touched the roof of their wretched rock hovel on March 12, after its absence of five months, only one of the brave little band was missing, but six died in April, four more in May, and seven in June. When Schley reached their camp, on June 22, there were only seven survivors.

RADIO ANNOUNCES ARRIVAL OF THE PARTY

No tablet or memorial of any kind had ever been erected to these soldiers of the United States Army, who truly died upon the field of honor. But in the hold of the *Bowdoin* we were bringing a beautiful bronze tablet to be erected at Cape Sabine by the National Geographic Society (see pages 700 and 706).

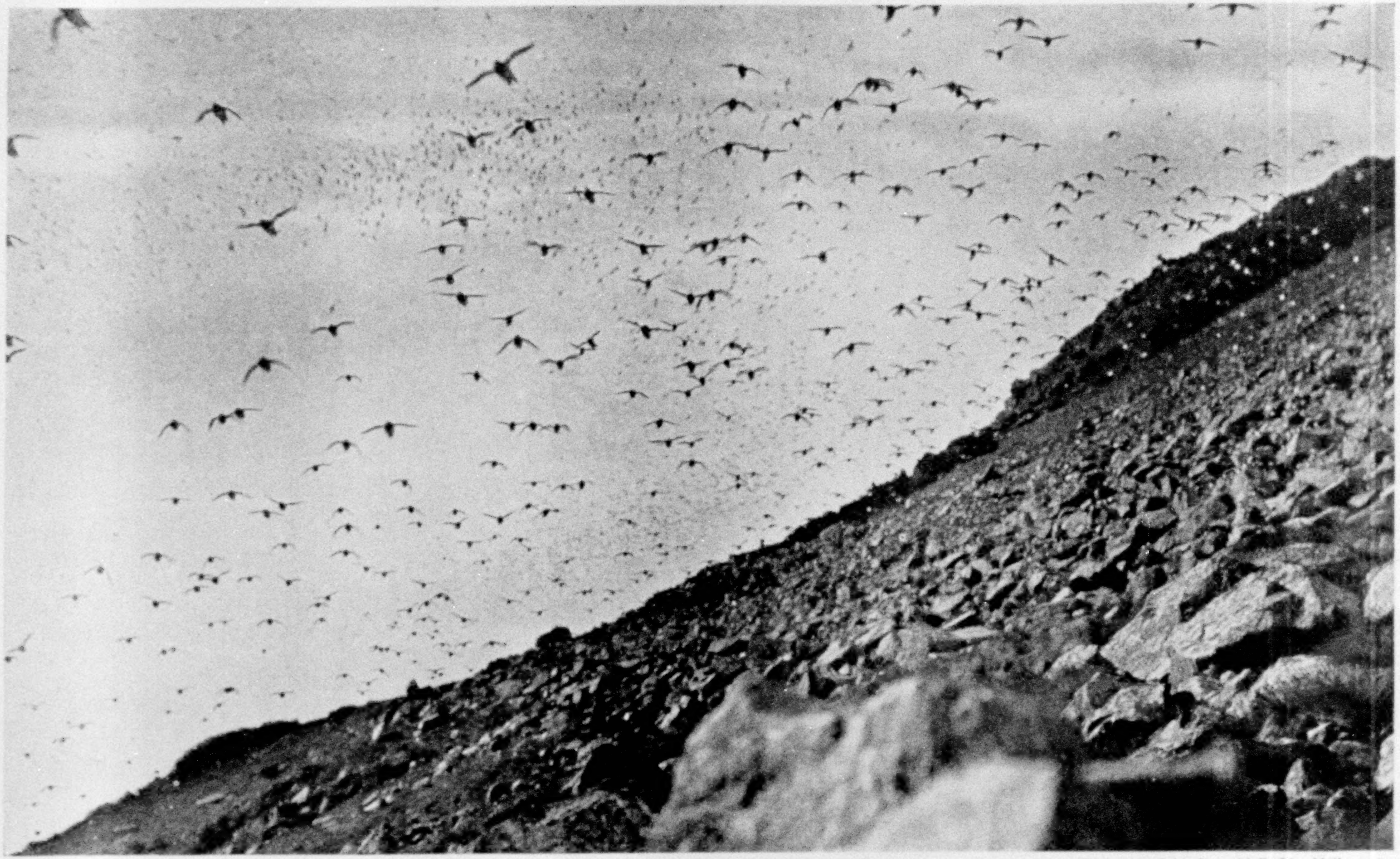
We established our winter quarters in Refuge Harbor, an ideal location, which had been utilized by the Kane Expedition of 1853-55.

Here we began unloading the *Bowdoin* on August 18, and on Sunday, August 19, through wireless telegraphy, we reported our arrival and the general good health of all the members of the expedition.

By September 6 the harbor was so firmly frozen over that my men, all new to the north, thought we were in for the winter. The next morning the ice had disappeared completely. So it continued, alternately freezing and breaking until September 22, when the thermometer dropped to 10 above zero, resulting in a fine layer of skim ice over the harbor.

By October 18 the hills were white with snow and harbor ice was strong enough to bear the men anywhere with safety. The *Bowdoin* was in her ice cradle for the winter.

The sun had been on its long journey south since June 21, each day a little



Photograph by Donald B. MacMillan

LITTLE AUKS ARRIVING IN THE VICINITY OF ETAH ON MAY 15

Millions of these birds darken the sky for hours when they appear practically on the same day each year. They play an important rôle in the life of the Eskimos, who literally scoop them out of the air (see illustration, page 682). A winter's store of food is thus easily obtained by an Eskimo family, and the soft little skins make warm and comfortable garments worn next to the body. The little auk is known by many names—dovekie, sea-dove, bull-bird, ice-bird, sea-king, and rotchie. It is known to the Eskimo as *arq-pud-e-arq*.

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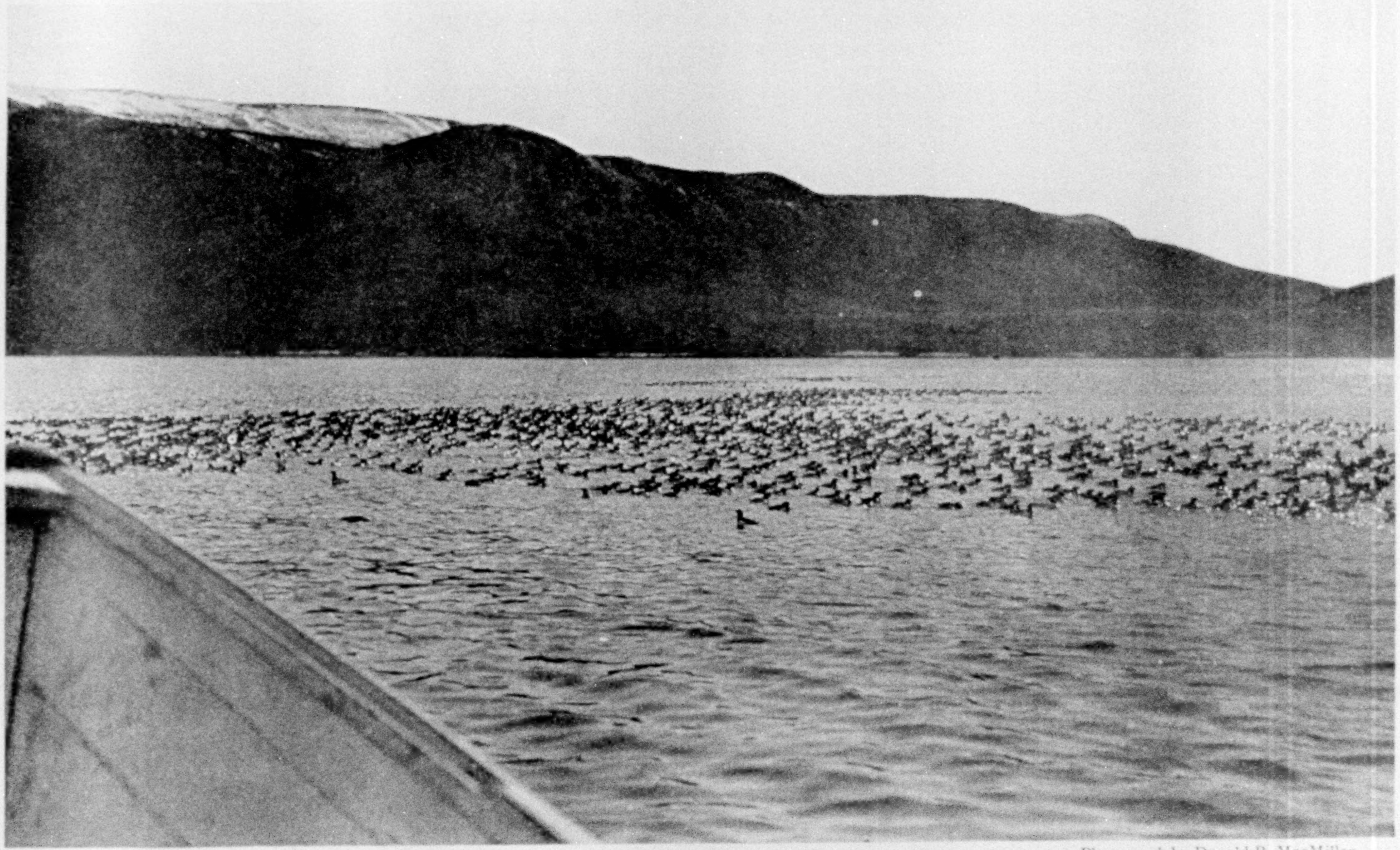
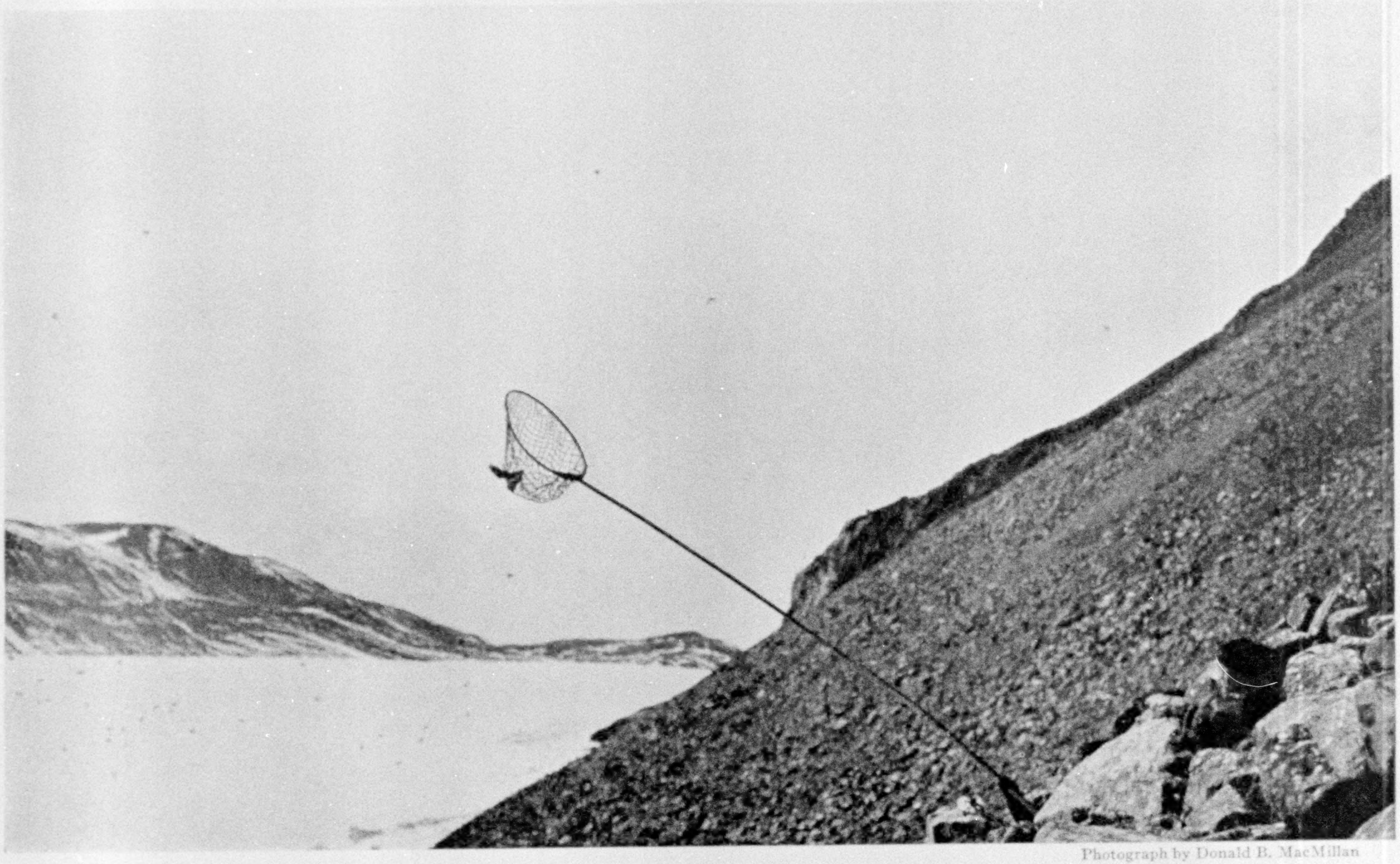


Photograph by Donald B. MacMillan

LITTLE AUKS ALIGHT IN ETAH HARBOR

These small members of the auk family are about the size of our starling. One egg is laid, usually on the steep talus slope of a mountain at the edge of the sea. Frequently the birds gather like great floating islands on the surface of the water. The vast numbers of these flocks on the mountain side attract the blue fox, who, like the Eskimo, not only feasts while the birds are at hand, but also lays by a store for winter use.



Photograph by Donald B. MacMillan

CATCHING LITTLE AUKS WITH A DIP NET

An Eskimo woman will average one bird a minute, sometimes capturing as many as five with a single sweep of the net (see text, page 721).

shorter and each night a little longer, and finally the day arrived, October 25, when it bade us good-bye for 117 days, not to return until February 18, 1924. The high hills which bordered our harbor had cut off the sun's rays for two weeks prior to this day, so that our sunless period was really of 132 days' duration.

Contrary to popular opinion, we did not experience continuous darkness in the Arctic from the date of the sun's departure until its return in the spring. Our nights were dark throughout this period, as they are in the United States, but our days at Refuge Harbor were twilight during the whole time.

SNOW BLANKET MAKES THE "BOWDOIN" SNUG

Looking ahead to temperatures of 50° and 60° below zero, we surrounded our little ship with a wall of snow about three feet in thickness and reaching to the rail.

Three snow houses were built on deck, one over my after-cabin, one over the main hatch, by which the boys reached the forecastle, and one over the forward hatch, to be used as a ventilating shaft for the crew's quarters (see illustration, page 691).

Previous Arctic expeditions have been seriously inconvenienced by the accumulation of ice on the walls of the cabins, formed by condensation of the breath and of steam from the cooking. The *Bowdoin*, especially built for Arctic work, with a double inside sheathing, was remarkably free from this trouble. On the *Roosevelt*, of the Peary Polar Expedition, bedclothes and books even froze to the walls, and frequently we were compelled to chop ice from our cabin floors, especially in my stateroom, which adjoined the cook's quarters.

The *Bowdoin* was so well protected by the wall of snow that our quarters were dry and comfortable at all times. With 12 tons of coal beneath our floor, and plenty of fuel for small oil stoves, we were very happy through the long, dark period.

RADIO CONTACTS WITH PRINCE RUPERT, B. C., ENGLAND, AND GERMANY

It has always been a question in the minds of people at home as to just how we spend our time during the Arctic night. First, let me say that the *Bowdoin* was electrically lighted, which added much to our happiness. Second, we were provided with a good library, musical instruments, and all kinds of games, of which Mah Jong seemed to be the favorite. Third, and best of all, was our radio. Upon leaving home I had no faith in this item of our equipment, for it seemed impossible that our little 100-watt station could keep in touch with the busy world to the south, and with our homes 3,000 miles distant.

Our radio equipment included two receivers of the standard Zenith circuit type, one for the reception of amateur, ship, and commercial land station radio telegrams, as well as programs from broadcasting stations; and the other a high-wave receiver to enable us to copy news, weather forecasts, etc., from transoceanic radio telegraph stations in various parts of the world.

The performance of our radio transmitter, of the same make, was marvelous, especially in consideration of its small power—only 100 watts—as contrasted with the average broadcasting stations' power of from 1,000 to 5,000 watts. It was of the close coupled type, using 500 cycle a. c. plate supply, with one tube on either side of the cycle, and storage-battery-operated throughout. It was necessary to limit our transmitting power to 100 watts in order to conserve the fuel used in operating the generator which charged our batteries.

Our voices were not heard in the States, but we hope that this record can be established by the expedition this summer.

Thousands of people in the United States listened every Wednesday night to our friends broadcasting to us from 9XN, Chicago, and wondered if we could possibly be hearing them. We never failed to pick up that station through the months of October, November, December, and January.

We often recognized the voices of our friends. On several occasions I heard my sister's voice distinctly. On several Sunday nights we heard ministers reading the Bible, uttering their prayers, preaching their sermons, and choirs singing hymns.

The four stations most consistently heard were Calgary, Canada; 9XN, Chi-

Photograph by Donald B. MacMillan

ALNAY-AH STARTING FOR AUKS: ETAH

Her 12-foot pole terminates in a wide dip net, with which she sweeps the air expertly for the little auks, or dovekies, known to Cape Cod fishermen as "pine knots." Their chief enemy is the glaucous gull, which often seizes an auk in mid-air and swallows it whole into the lower throat.

cago; WOC, Davenport, Iowa; and WOAW, Omaha, Nebraska.

We sent out to the world 32,000 words in telegraphic code, received chiefly by 9BP, Jack Barnsley, Prince Rupert, B. C. We received 100,000 words by code from the boys of the American Radio Relay League, from Leafield, England, and from POZ, Nauen, Germany. Every evening at 5 o'clock we picked up the English station, and promptly at 6 p. m. the German station, giving us the news of the world.

My operator, with the typewriter in front of him and phones on his ears, typed the news, and every night as we went forward to our supper under the snow, there, on the dining table, lay the daily news sheet. This served to break the monotony of the dark period and was eagerly welcomed by each member of the expedition.

On Christmas and New Year's we received many messages from our relatives and friends at home, including the following greeting:

"Even in its days of deepest distress the Greely Expedition made Christmas a day of rejoicing and praise. Our most earnest desire was knowledge of the health and happiness of the dearest ones at home. Science and circumstances spare you such doubts. The National Geographic Society sends this Christmas message of good cheer to all members of the MacMillan Expedition, with its assurance that their health and success are dear to our hearts. Happy New Year.

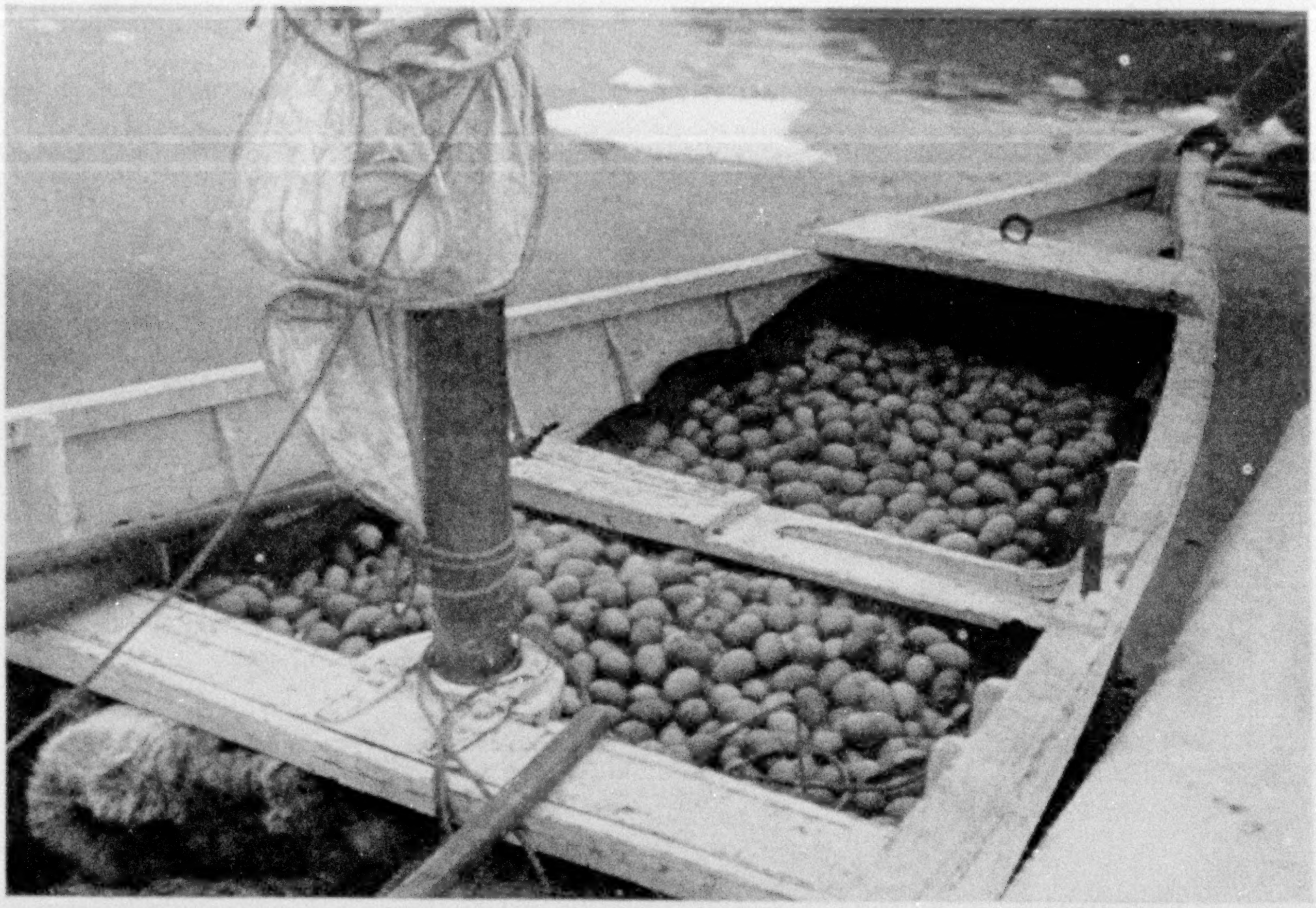
"A. W. Greely."

DAILY EXERCISE—WALKING, SNOWSHOEING AND SKIING

Because of our meteorological observations for the United States Government, and our magnetic work for the Department of Terrestrial Magnetism, Carnegie Institution of Washington, D. C., we were regular in our habits, having breakfast at 9, dinner at 3, and supper at 8 in the evening.

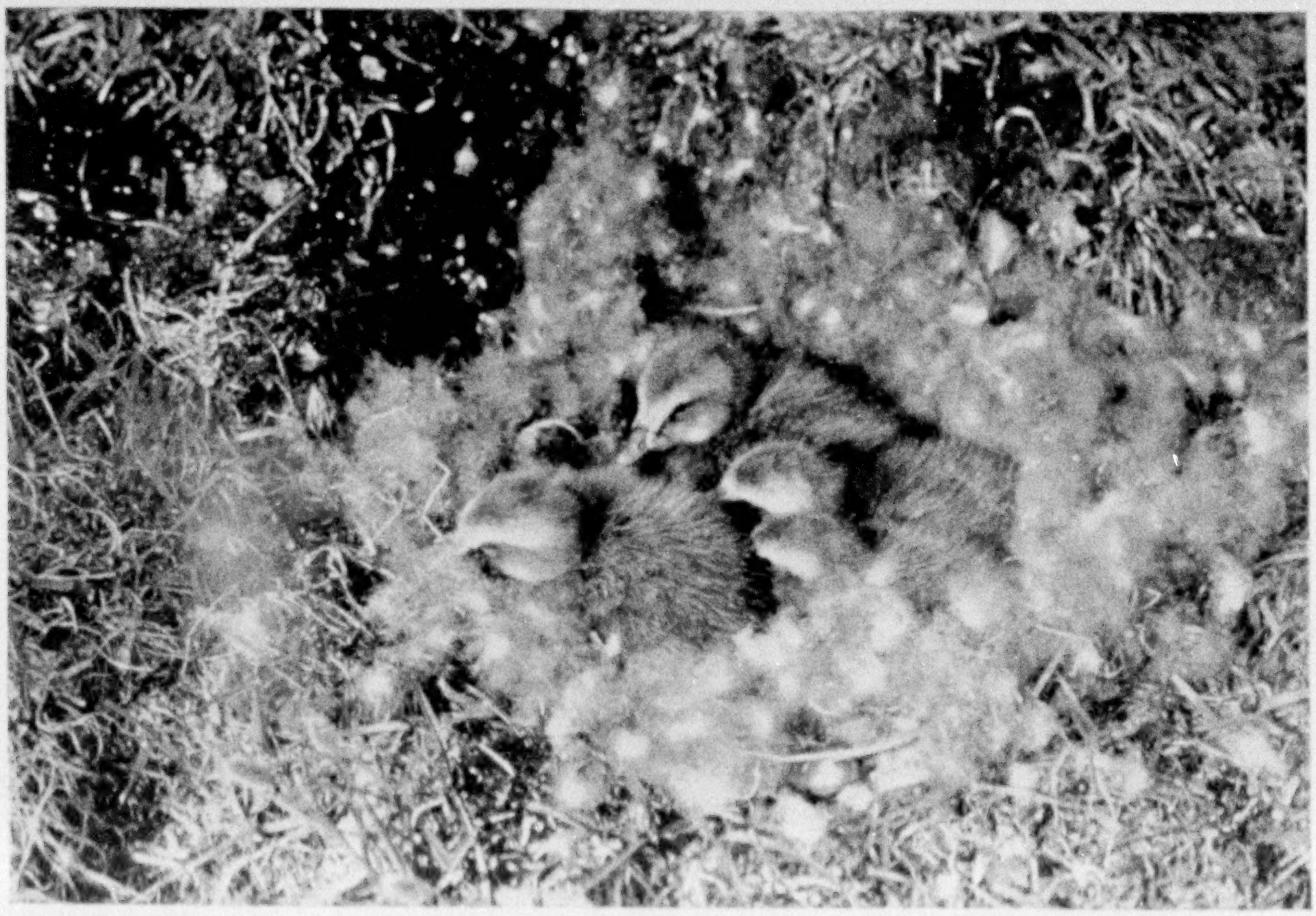
Nearly every man took exercise regularly, walking on bright moonlight nights far from the ship, repairing our snow wall, shoveling snow from the entrances, tending and feeding the dogs, snowshoeing, and skiing. The boys generally retired at midnight, to be called promptly at 8:30 in the morning.

Much has been said concerning this depressing period of darkness. Very little,



A BOATLOAD OF 4,000 EIDER DUCK EGGS

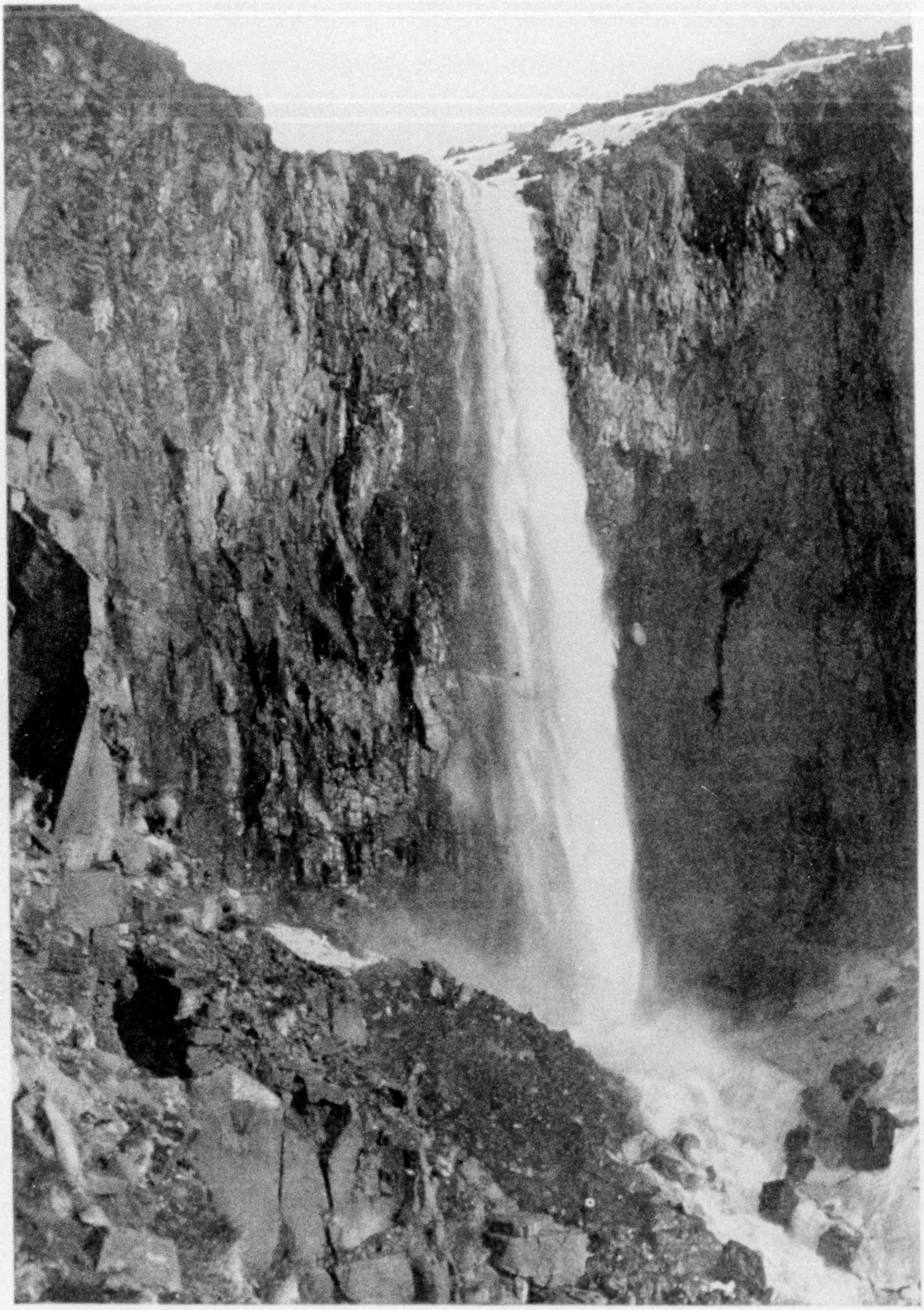
Both the explorers and the natives prize this addition to the winter's food supply.



Photographs by Donald B. MacMillan

YOUNG EIDER DUCKS IN THEIR NEST AT LITTLETON ISLAND IN MID-JULY

The northern eider breeds on the islands of the Greenland and Ellesmere Island coasts. Four thousand eggs may often be gathered from one small island in a few hours. The beautiful king eider arrives at Etah in May with the northern eider and frequents the same coasts.



Photograph by Donald B. MacMillan

A WATERFALL IN NORTH GREENLAND NEAR PORT FOULKE

In summer the musical sound of falling water greets the ear all along the west coast of Greenland.

Photograph by Donald B. MacMillan

SEA BATHING 12 DEGREES FROM THE NORTH POLE: ETAH

Etah, the most northern settlement in the world, consists of only five black holes in a sloping hillside, and in some years these are not inhabited. The cliffs of its beautiful harbor rise 1,100 feet from the water's edge. It is here that the MacMillan Expedition of 1925, under the auspices of the National Geographic Society, will establish its main base (see text, page 673).

however, has been written about the long moonlight periods of each month, when the moon comes above the horizon and remains there continuously. It swung around in a great circle over our heads, about ten days each month, and turned the region into a veritable fairyland.

During these wonderful times, we traveled hundreds of miles with our dogs to visit the Eskimos in their homes to the south, where we always found much of interest in the study of their domestic life.

The nearest village was Nerky, 60 miles by sledge route to the south on Inglefield Bay. To reach it we had to sledge over the sea ice, closely following the land to Cape Alexander. Here we crossed a tongue of the Great Mer de Glace and went galloping along the shore to Peteravik, and then on down past the face of another glacier. There were many exciting experiences in working on slippery ice slopes, where a drop into the sea would mean death.

As soon as the Eskimos learned that we were in winter quarters at Refuge Harbor, visitors were coming and going throughout the winter. All were eager to hear the strange voices coming through the air, and to see our 20,000 feet of motion pictures, which brought forth many an "Ooh" and "Ah" at the wonders of civilized life.

BRONZE TABLET OF THE NATIONAL GEOGRAPHIC SOCIETY IS ERECTED

Since we had failed the preceding summer to reach Cape Sabine, 30 miles to the northwest, on the shore of Ellesmere Island, our first duty in the spring was to carry out the request of the National Geographic Society—to place its bronze memorial in the center of the Greely Camp.

Early in May I left the ship, accompanied by my faithful dog-driver, E-took-a-shoo; his brother, Ka-ko-tchee-ah, and my Labrador boy, Abram Broomfield, on a reconnaissance to examine the condition of the ice of Smith Sound, and to select a suitable place for the tablet.

We crossed the Sound in seven hours, and reached the site of the Greely Camp in a blinding snowstorm. The remains of the rock hut could still be seen projecting from the snow.

Walking through the little valley to Cemetery Ridge, where many of the bodies were found by the relief party in the spring of 1884, we came upon the ring of rocks which had held down the tent of the starving men. A bare spot in this vicinity was still littered with the remains of their camp.

Stretching southward from the cape to the very horizon was a large body of water, which always buoyed the men of the Greely party with the hope that a ship might reach them at any time during the fall and spring.

A return trip of eight hours brought us back to our ship at Refuge Harbor. Our time spent in crossing the Sound with dog teams is of especial interest, since the party of Dr. Isaac Israel Hayes in 1861 consumed about 31 days in passing from shore to shore. Had the Greely party been equipped with dogs and some reliable Eskimos, all might possibly have crossed to Greenland successfully and been saved by living with the natives.

A few weeks later we crossed again with four dog teams. The tablet was landed in the center of the camp, where we bolted it securely to a 100-ton bowlder.

The work completed, we covered it with the American flag. The next day we unveiled it in the presence of the Eskimos, and told them to inform their children that the tablet must remain forever, in honor of the white men who died there so many years ago. They seemed to understand the object of our visit and the purpose of the tablet, and promised me they would always protect it (see illustrations, pages 700 and 706).

IN SEARCH OF THE MUSK OX

A few weeks later we left the ship again, our objective being Eureka Sound, some 200 miles to the west, in search of that strange and most interesting animal of the Far North, the musk ox, more nearly allied to the buffalo than any other living animal. It is of interest to scientists to know that the range of this animal extends to the very edge of the Polar Sea, just as far north as land goes, where it lives during the darkness of the long night upon wind-swept areas covered with frozen grass and moss.

Upon our visit to Cape Morris Jesup, the northernmost point of land in the world, distant 380 nautical miles from the North Pole, we found great herds of these animals roaming the hills; in fact, they range all through northern Greenland, Grant Land, and Axel Heiberg Island. Their enemy is the white wolf, whose tracks are seen wherever musk oxen are found.

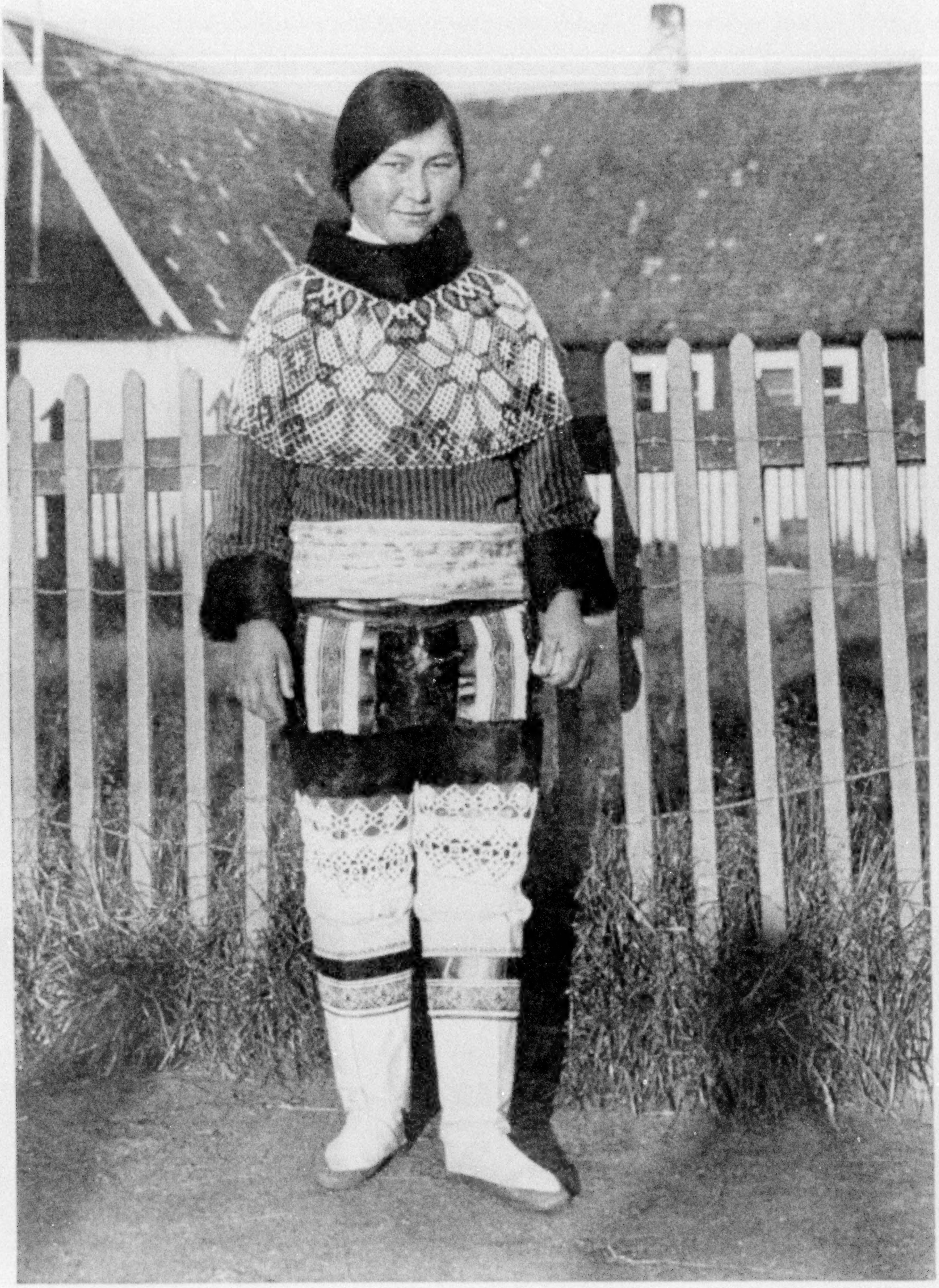
After struggling with deep snow and reaching Victoria Head with considerable difficulty, we emerged upon the smooth ice fields of Flagler Fiord, over which we galloped merrily toward the pass leading between the high mountains of Ellesmere Island to Bay Fiord.

As we proceeded through the valley of Ellesmere Island's western shores, we encountered a huge glacier coming down between the mountains at right angles to the course of the valley and blocking it almost completely. E-took-a-shoo and Ka-ko-tchee-ah, who had passed through the valley in 1910 and 1911, were astounded at the rapid advance of the glacier, which agrees with our observations of every other glacier from 76° N. to the edge of the Polar Sea.

With difficulty we succeeded in squeezing between the face of the glacier and the slope of the hills. Great blocks of ice, continually falling from the face of the glacier into the narrow pass, so terrified the Eskimos that twice they abandoned their dogs and sledges and scrambled up the side of the mountain.

At the other end of the glacier we lowered the sledges with ropes, harnessed the dogs, and, with a sigh of relief, drove westward. We all vowed never again to attempt the pass, but to proceed home over the Ellesmere Island ice cap, at a height of 4,000 feet, rather than tempt fate.

We emerged upon the slippery ice of Bay Fiord in a gale of such violence that our dogs and sledges were repeatedly blown sideways for hundreds of yards at

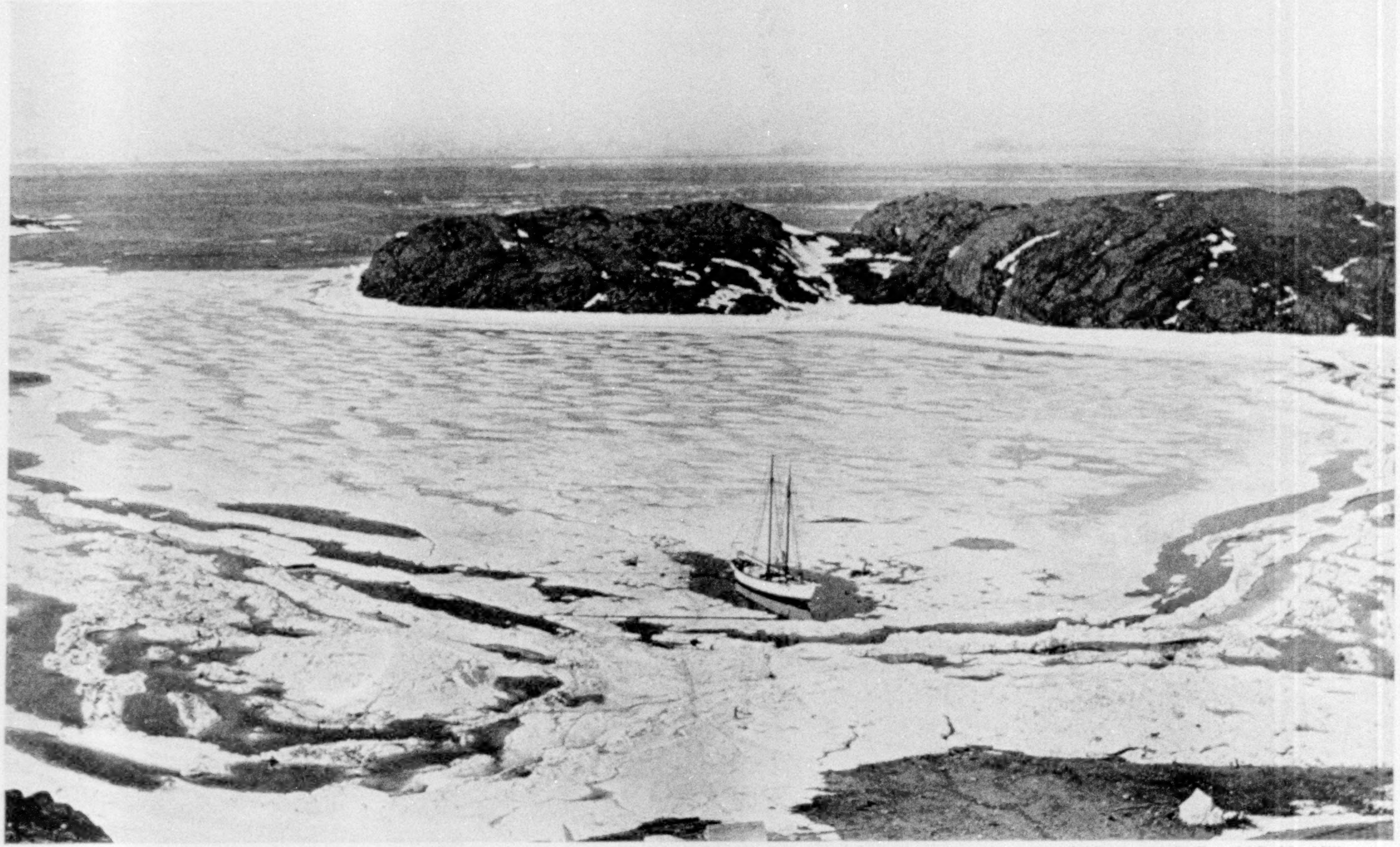


Photograph by Donald B. MacMillan

AN ESKIMO GIRL AT HOLSTENSBORG, GREENLAND

She wears over her shoulders an elaborate homemade collar of open beadwork. Her blouse is of brightly striped, imported material and her trousers of hairy sealskin. Her red-and-white boots are also of sealskin, with the hair removed, and decorated at the top with geometrical patterns of colored skin. Holstensborg, a picturesque town just above the Arctic Circle, overlooks a fine harbor. Its four or five Danish houses occupy a common inclosure, to the west of which live the Eskimos. The entire population numbers 300.

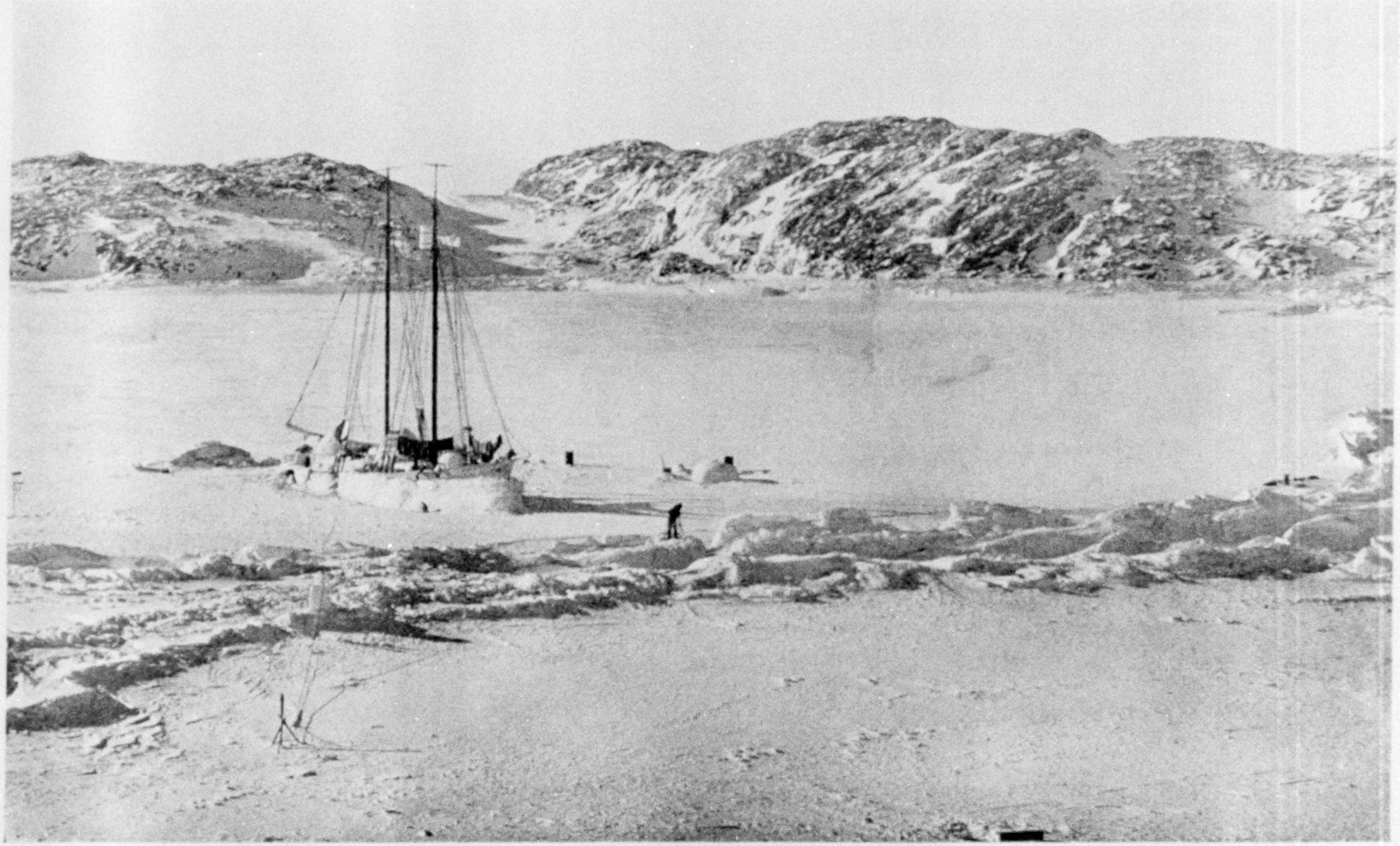
XUM



Photograph by Donald B. MacMillan

MIDSUMMER: THE SCHOONER "BOWDOIN" IN REFUGE HARBOR, GREENLAND, JULY 1, 1924

In a good harbor there is no danger of a ship being crushed by the ice, provided it is not in a tidal crack—a gigantic mouth which opens, shuts, and grinds continuously. The *Bowdoin* made an attempt to leave the Refuge Harbor of Kane on July 29, but did not get clear of rocks and ice until August 1.



Photograph by Donald B. MacMillan

THE "BOWDOIN" CLAD IN WINTER ICE: REFUGE HARBOR, APRIL 10, 1924

Note the three snow houses built on the deck and the ship's warm blanket of snow on the sides. The ice barrel (lookout) is to be seen aloft, just below the wireless rigging. Most of the radio messages from the *Bowdoin* were received last year on the Pacific coast. The Eskimos were eager listeners to the strange voices coming through the air from America, England, and Germany. They were frequently entertained on board ship during the winter.

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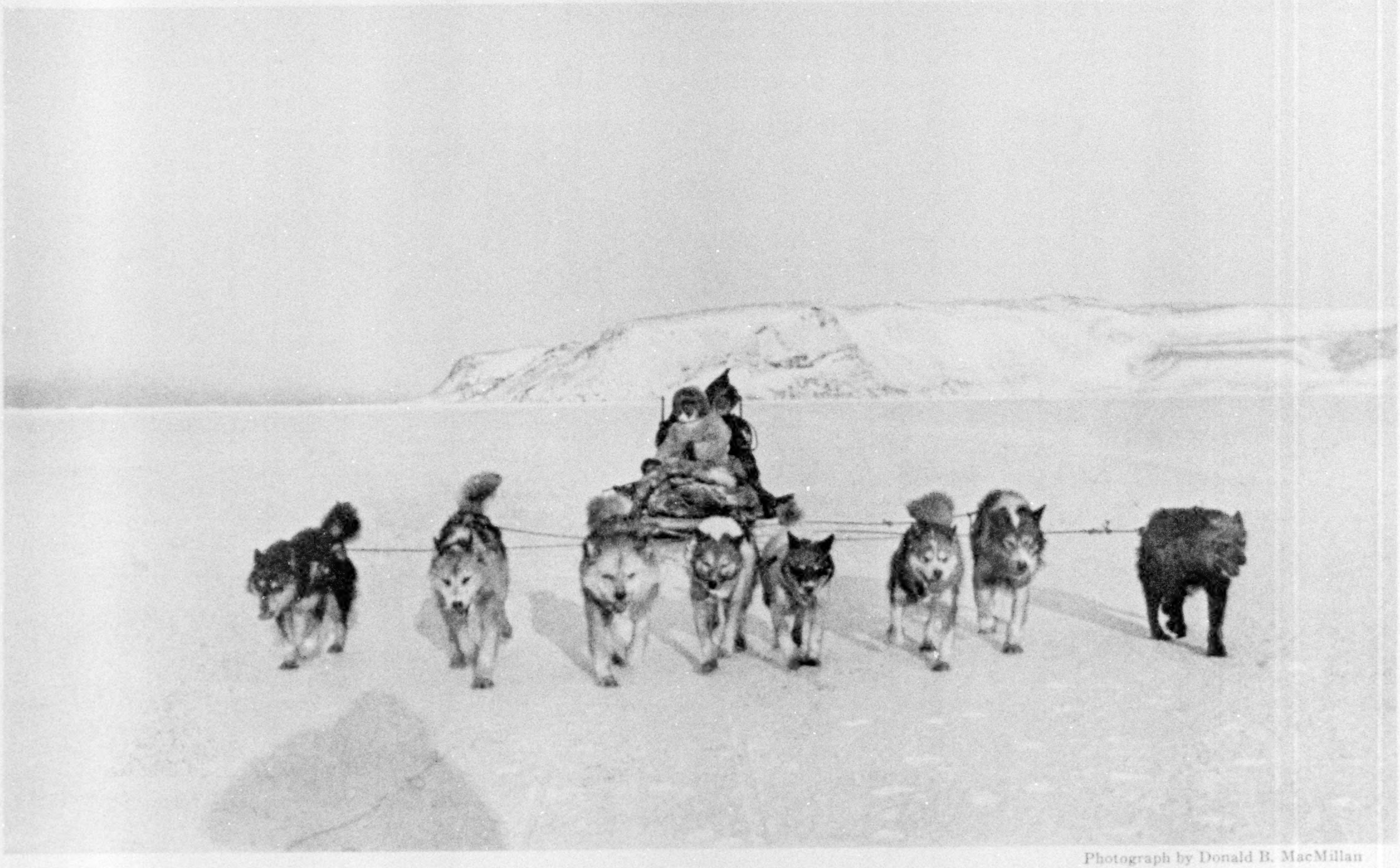
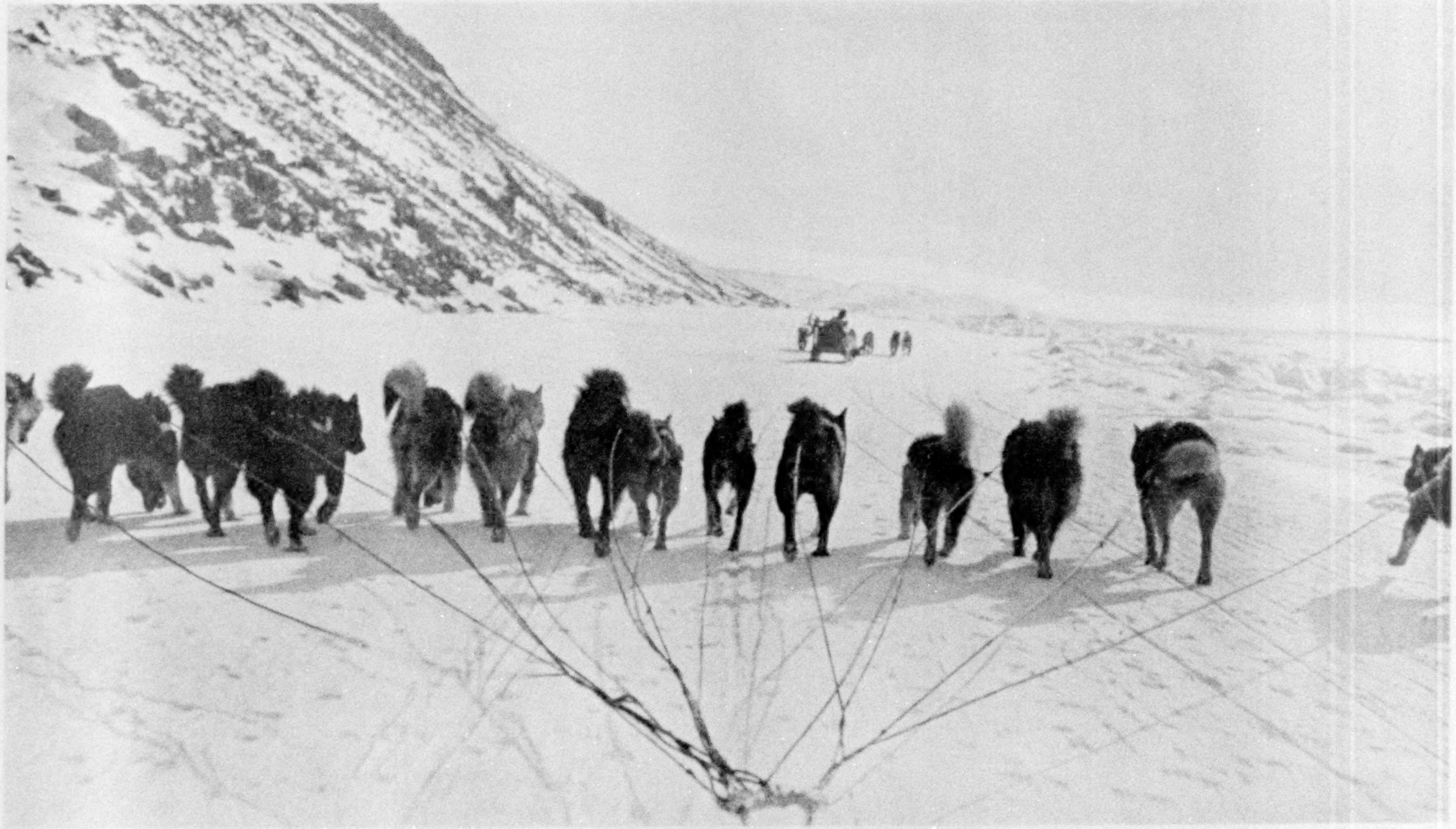


Photograph by Donald B. MacMillan

COMING: SOUTHWARD BOUND FROM CAPE HATHERTON, A FEW MILES NORTH OF ETAH

Dog-drawn sledges are the only means of transport and travel along the west coast of Greenland north of the Arctic Circle, when ice in the sea prevents the use of the kayak (see page 698). Each sledge is drawn by a team of from eight to fourteen dogs, who spread out like a fan.

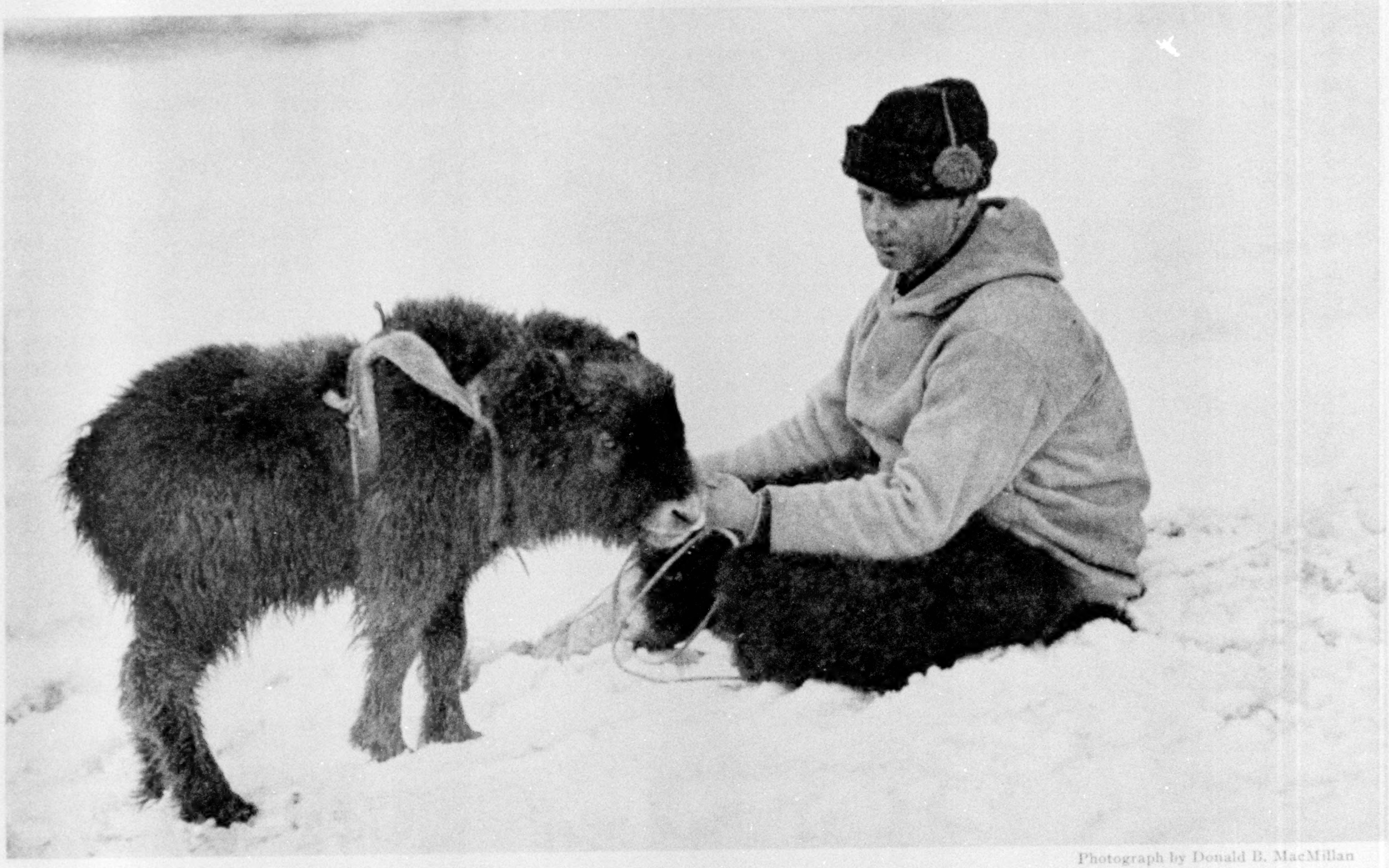


Photograph by Donald B. MacMillan

GOING: SLEDGING ALONG THE BROAD, LEVEL ICE FOOT NORTH OF RENSSELAER BAY

Ninety miles north of Etah is Rensselaer Bay, the winter quarters of Dr. Elisha Kent Kane in 1853-55. Sandstone mountains stand on both sides of the bay, in contrast with the rounded granite hills of the adjacent country.

XUM



Photograph by Donald B. MacMillan

THE AUTHOR MAKES FRIENDS WITH A YOUNG MUSK OX

When convinced that no harm was intended, this calf speedily became friendly. At the time of its capture it struggled fiercely, repeatedly jumping high in the air and coming down on its back. This is its instinctive mode of crushing the white wolf, the vicious enemy of the musk ox.

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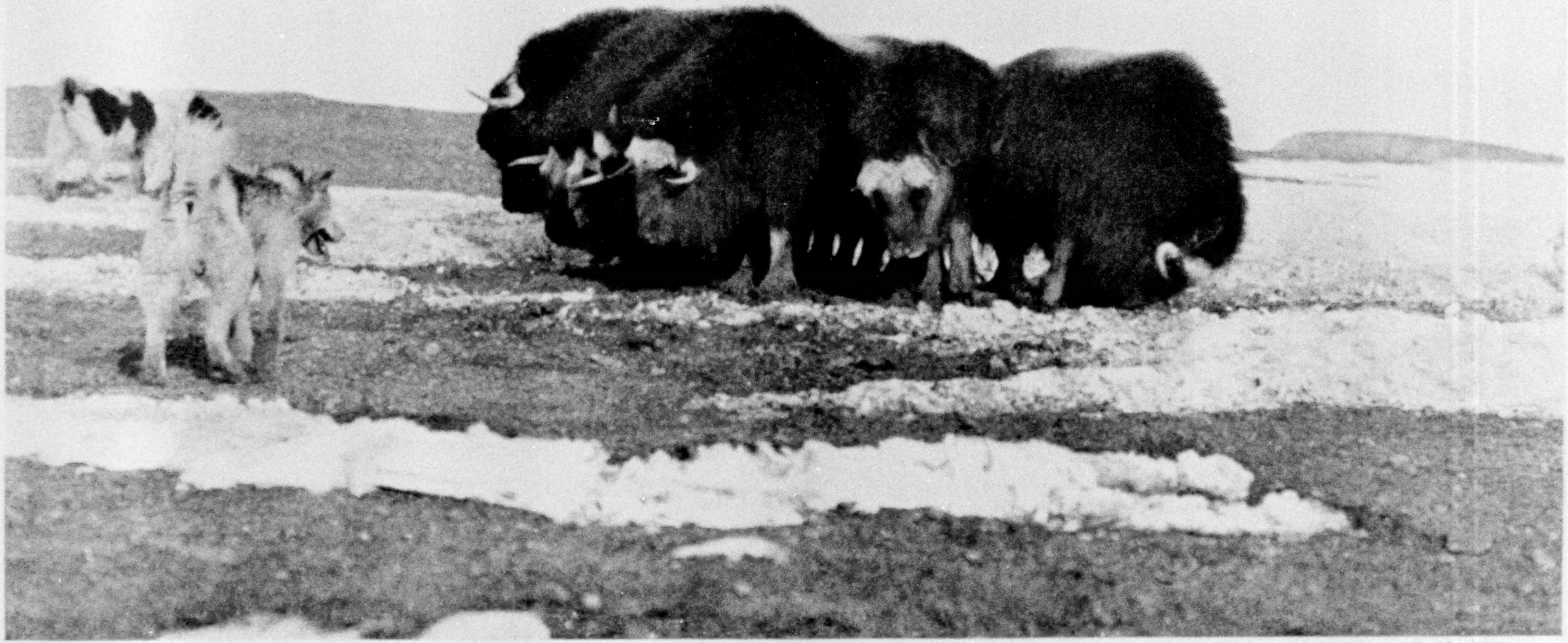
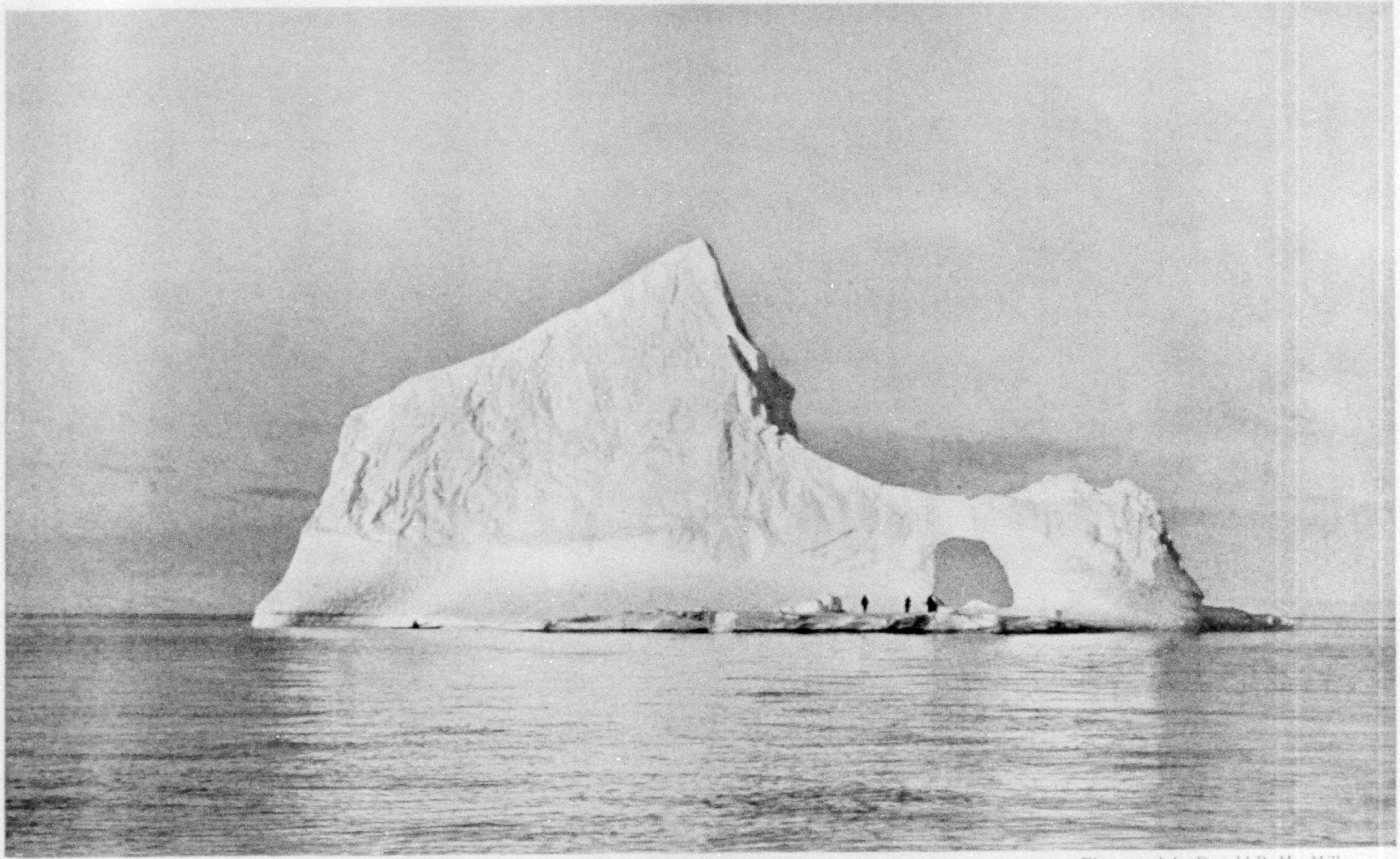


Photograph by Donald B. MacMillan

MUSK OXEN READY FOR THE FRAY: BAY FIORD, ELLESMERE ISLAND

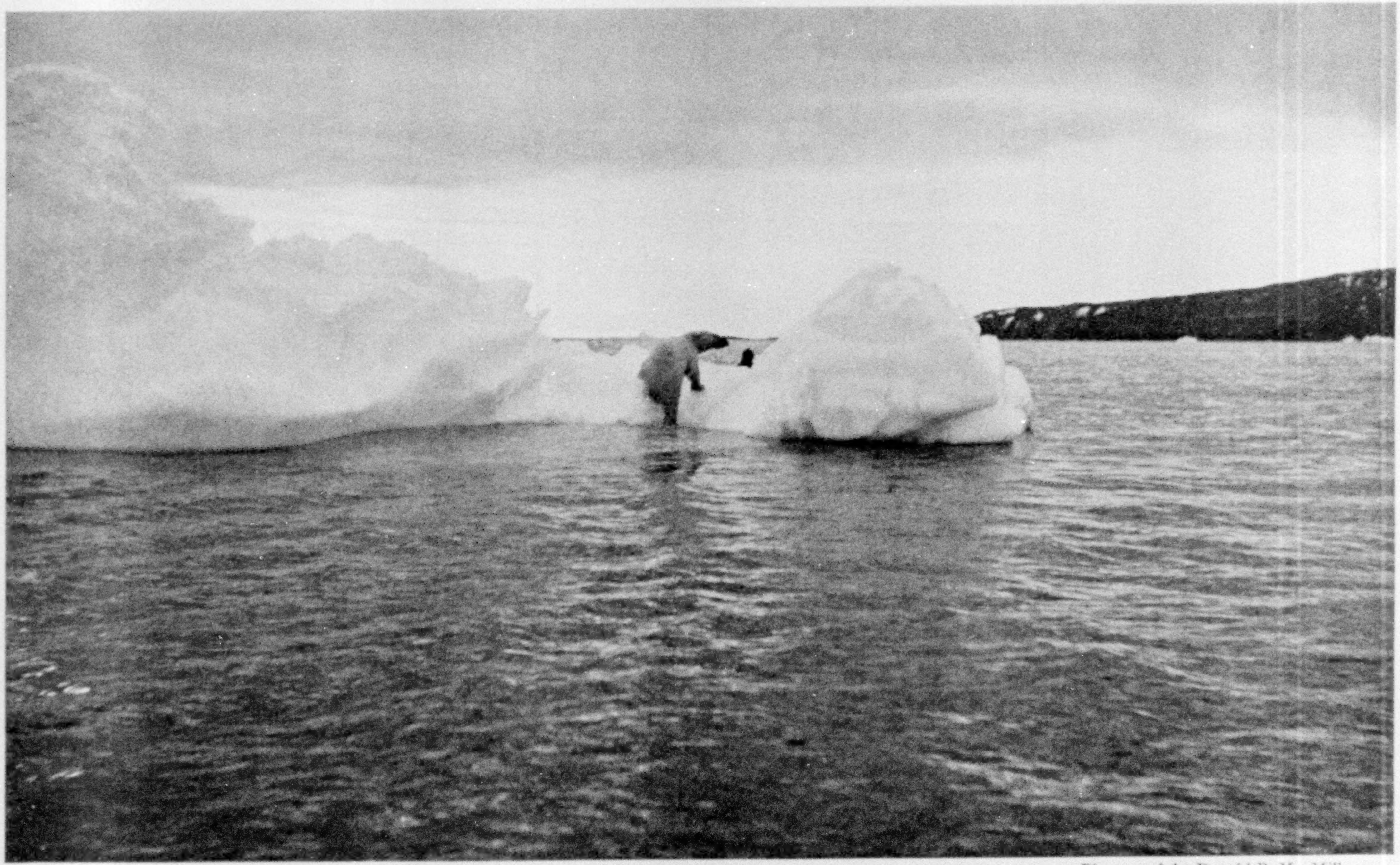
When at bay, the herd is a huddled, formless mass. All the animals, even the calves, face the enemy, but the little ones hide beneath their mothers' long, shaggy hair. The oxen charge with their heads close to the ground, and without order, but retreat at once to the herd, for fear of being cut off and surrounded. The author obtained the first motion pictures ever made of musk oxen. The Eskimos call Ellesmere Island *Oo-ming-man*, the Land of the Musk Oxen.



Photograph by Donald B. MacMillan

AN ICEBERG IN ETAH HARBOR

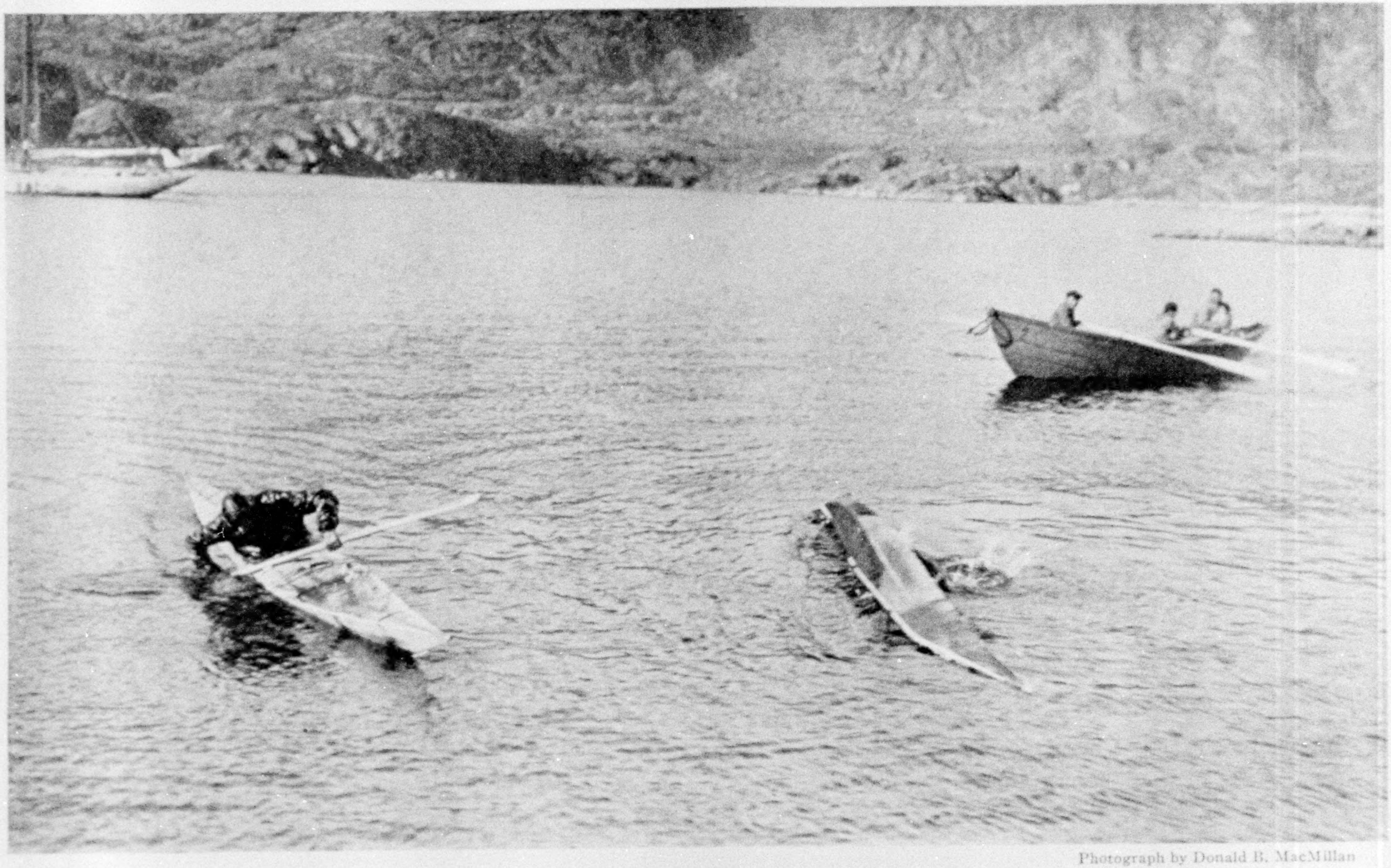
This white mountain arrived at Etah and remained in sight of the author's headquarters for two years. Note the arch, which occurs not uncommonly in large bergs.



Photograph by Donald B. MacMillan

"THE TIGER OF THE NORTH" ASCENDING A BERG IN ETAH HARBOR

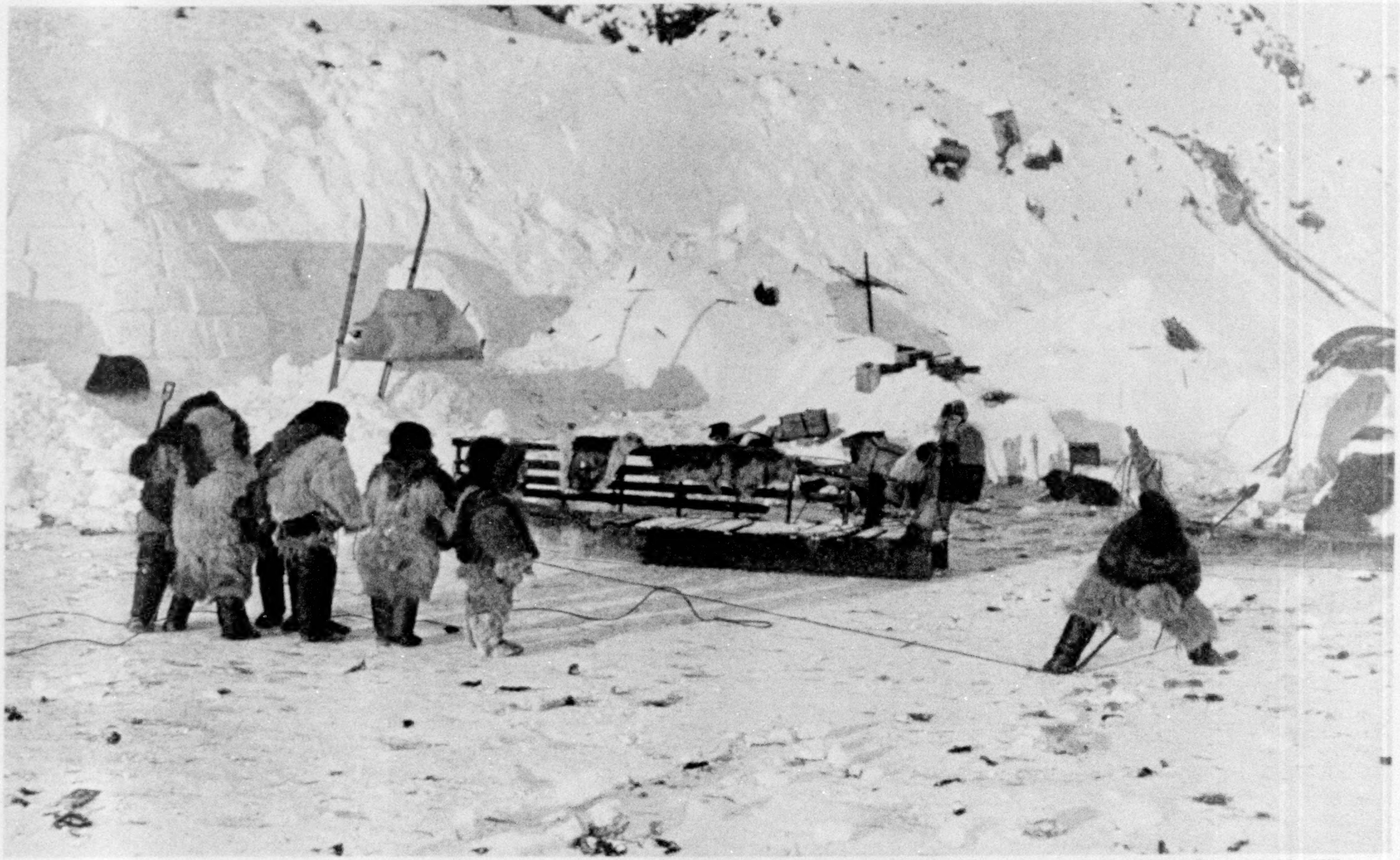
The Eskimo finds his greatest pleasure in running across fresh bear tracks and being ahead of all his companions in pursuit. The skin of the polar bear is considered indispensable for trousers, without the warmth of which long journeys in the winter time would be impossible. It is also used as a bunk rug. The "water bear" of sailors is amphibious, being more at home in the water than on the ice fields. It has been reported swimming 100 miles from land.



Photograph by Donald B. MacMillan

KAYAK MANEUVERS IN HOLSTENSBORG HARBOR, GREENLAND

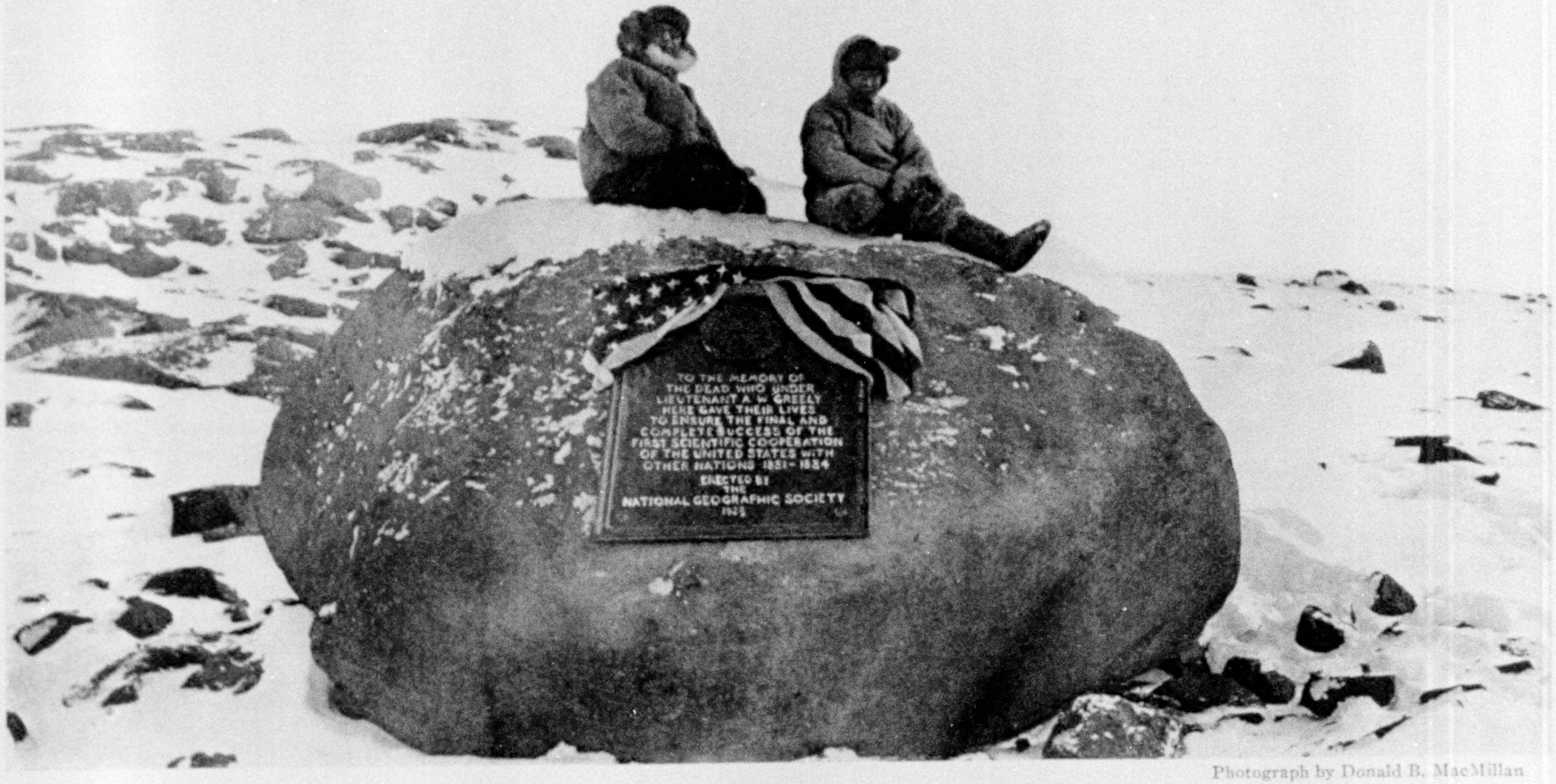
The long, narrow boat of the most expert boatmen in the world has been aptly termed "the most perfect application of art and ingenuity to the pursuit of necessaries of life within the Arctic Circle." The ability of the Greenlander (as the Eskimo likes to be called) to roll over in his kayak, to hang head-down in the water, and even to spin over and over, as the man in the kayak on the right is doing, affords a unique exhibition of skill. The one-man craft is about 16 feet long, with a beam amidships of 16 inches.



Photograph by Donald B. MacMillan

ESKIMO CHILDREN PLAYING "CAPTURING A WALRUS"

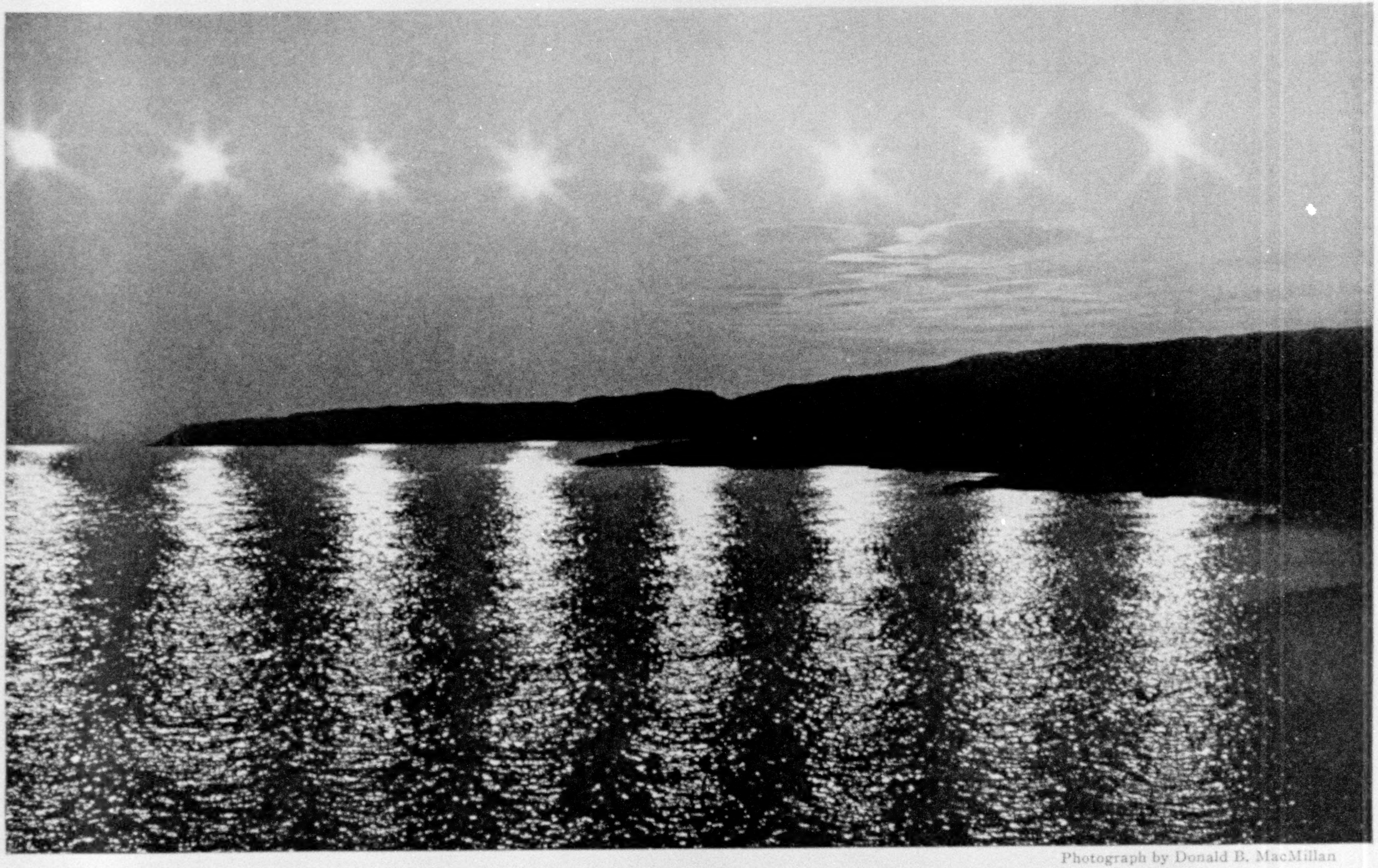
Smith Sound Eskimos gather every spring at Peteravik (Cape Chalon), some 25 miles south of Etah, to hunt walrus and bearded seal in the open water offshore. The tribe makes the annual meeting a picnic occasion, when warriors tell stories of the hunt and laughing children play games. The boys are wearing bearskin trousers and the girls long sealskin boots.


TO THE MEMORY OF
THE DEAD WHO UNDER
LIEUTENANT A. W. GREELY
HERE GAVE THEIR LIVES
TO ENSURE THE FINAL AND
COMPLETE SUCCESS OF THE
FIRST SCIENTIFIC COOPERATION
OF THE UNITED STATES WITH
OTHER NATIONS 1881-1884
ERECTED BY
THE
NATIONAL GEOGRAPHIC SOCIETY

Photograph by Donald B. MacMillan

THE NATIONAL GEOGRAPHIC SOCIETY'S MEMORIAL TABLET TO THE HEROIC DEAD OF THE GREELY EXPEDITION: CAPE SABINE, ELLESMERE ISLAND

After crossing Smith Sound, the MacMillan party landed the bronze tablet in the center of Greely's former camp and bolted it securely to a 100-ton bowlder. "The work completed, we covered it with the American flag. The next day we unveiled it in the presence of the Eskimos and told them they should inform their children that the tablet must remain forever, in honor of the white men who died there so many years ago."

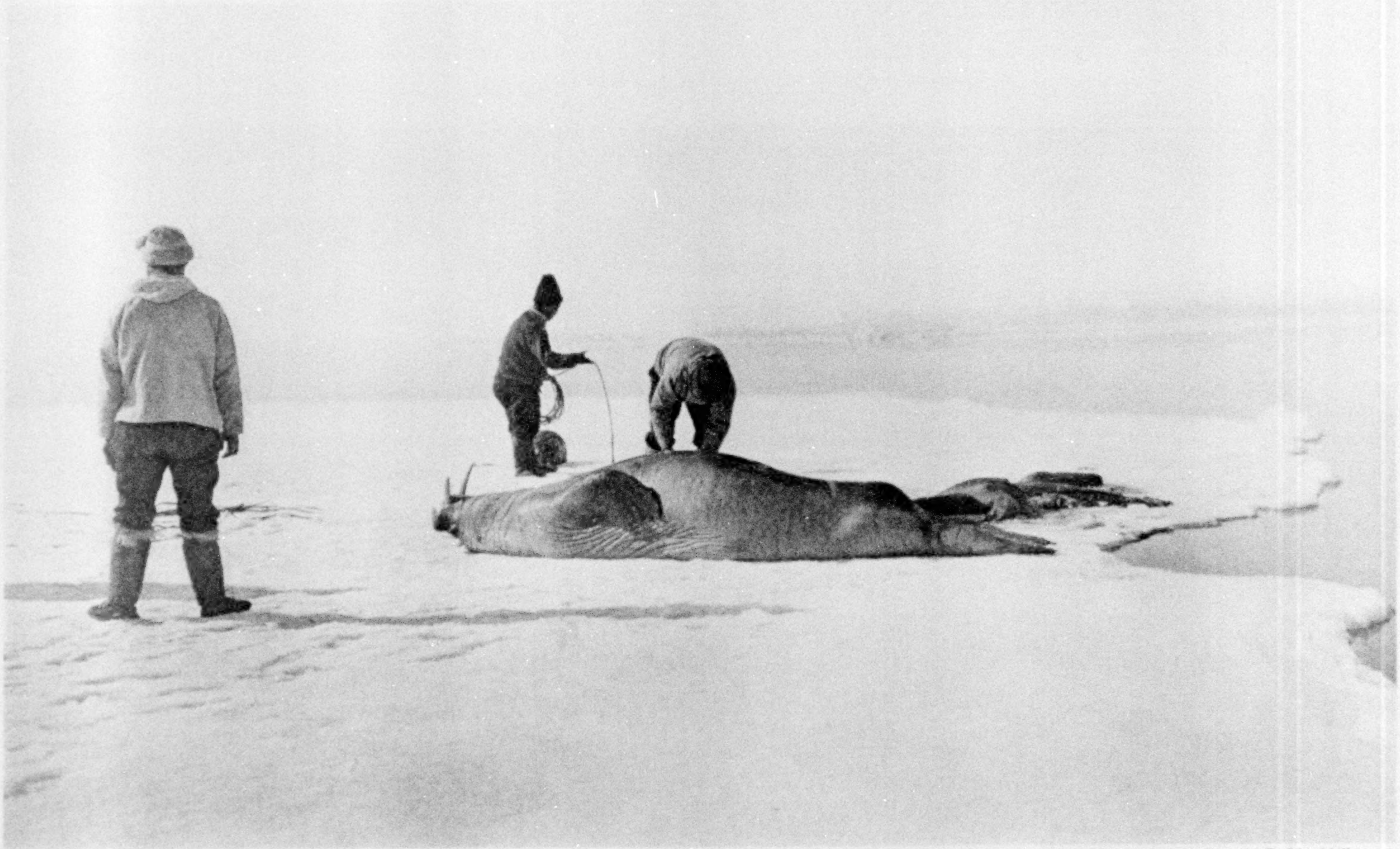


Photograph by Donald B. MacMillan

THE MIDNIGHT SUN FROM SUNRISE POINT, LOOKING NORTH OVER LITTLETON ISLAND

Eight exposures were taken on the same photographic plate at 20-minute intervals. Sunrise Point was named by the Hayes Expedition, which found it a favorable spot to observe the first rising of the sun after their memorable winter. Littleton Island is famous in Smith Sound history. Though named by an Englishman, an American explorer, Dr. Elisha Kent Kane, was the first to step upon the island and to unfurl the American flag over it 72 years ago.

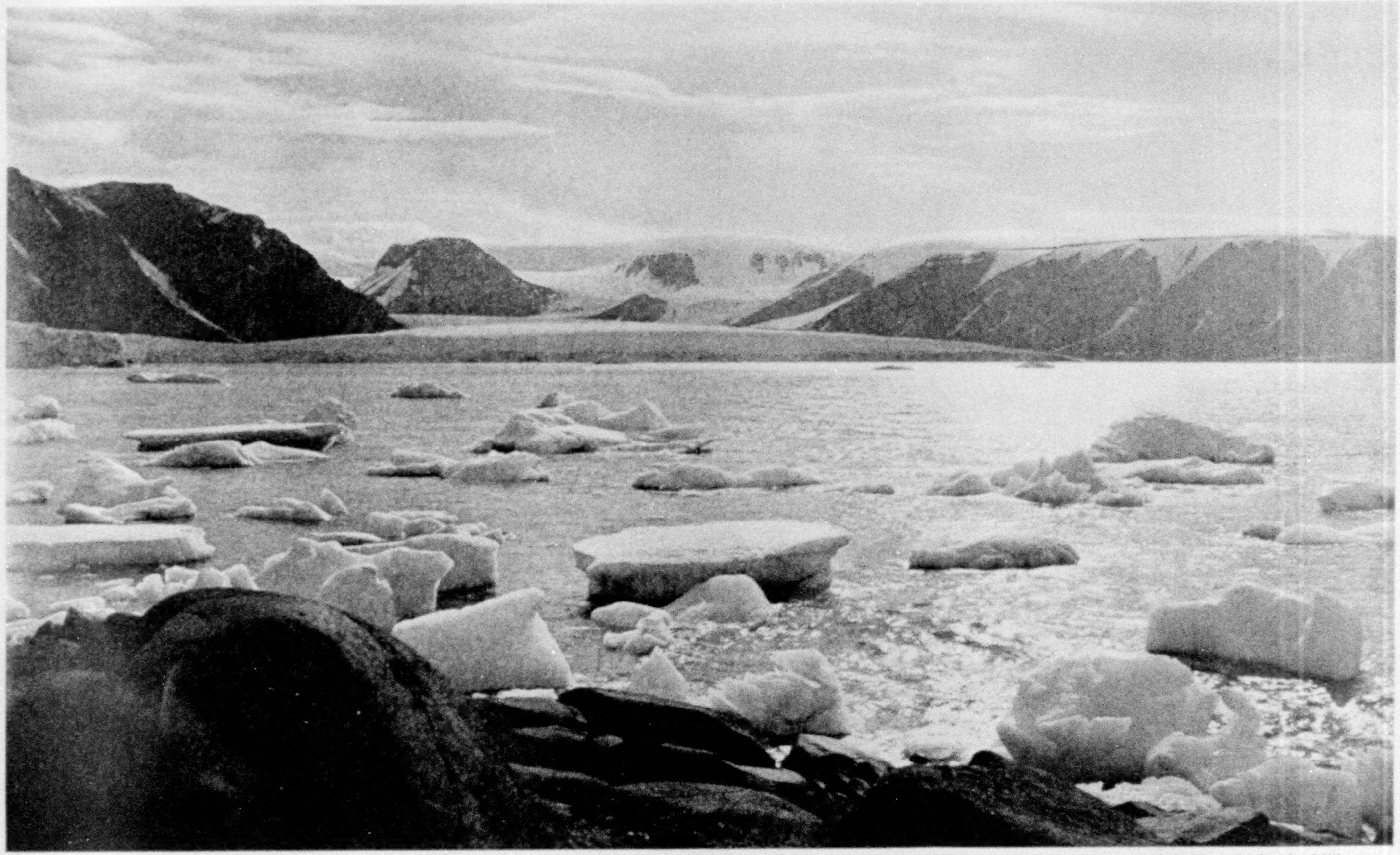
XUM



Photograph by Donald B. MacMillan

A WALRUS ON PAN ICE

The walrus furnishes the bulk of the food of Smith Sound natives and also constitutes an invaluable meat supply for their dogs—necessary companions of a successful hunter. Known as the "sea horse," or "morse," of 100 years ago, the walrus has figured largely in Arctic history on account of its prized ivory tusks and strong hide. Greenland tithes of six centuries back were paid partly in walrus ivory.



Photograph by Donald B. MacMillan

SONNTAG BAY AND GEORGE W. CHILDS GLACIER, SOUTH OF CAPE ALEXANDER

This bay is named for the astronomer of both the Kane and Hayes expeditions (1853-55 and 1860-61, respectively). Cape Alexander is midway between the Arctic Circle and the North Pole.

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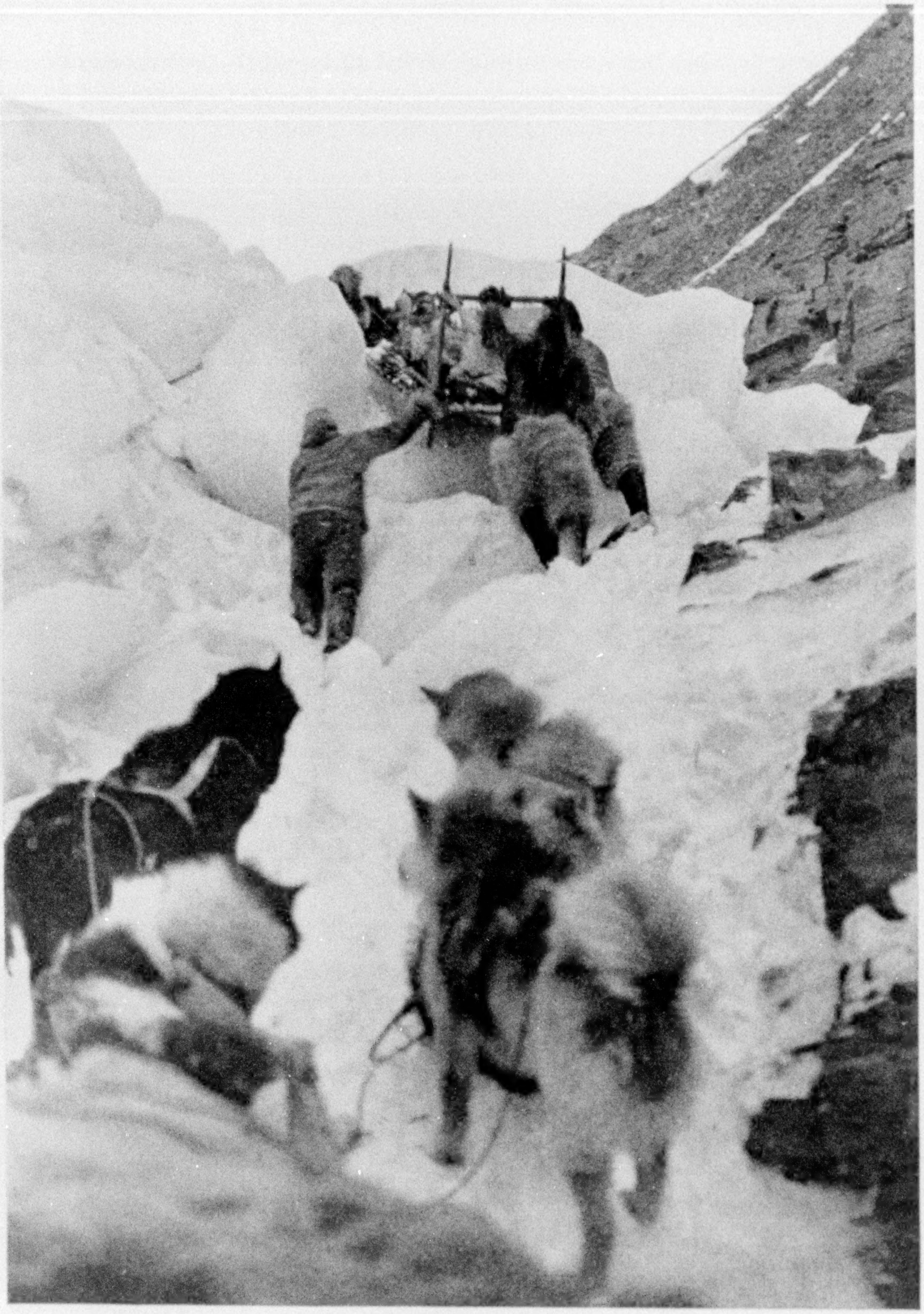


Photograph by Donald B. MacMillan

ROUGH SLEDGING ALONG THE FACE OF REID GLACIER

The condition of the sledging surface is the main factor in estimating the load of a team. For the average sledging surface met with on a long spring trip, 80 pounds to each dog is a good load. But the strength of the driver—who must often struggle to save the sledge from destruction—the qualities of the sledge itself, and the distance to be traversed are also to be considered.

a time. It was a fight to regain the north side of the fiord, where we planned to camp for the night.

THE EXCITING CAPTURE OF AN ARCTIC WOLF

The next morning our dogs galloped westward before a strong wind to a better sledging surface lightly covered with snow, upon which we discovered many fresh tracks of polar bear. During the next few hours we had many a mad race following these trails, the dogs being much excited.

Nothing happened, however, until about noon, when one of the men looked back over his shoulder and descried in the distance an animal following our trail. It proved to be an enormous snow-white wolf. As there is only one specimen of this animal in any museum of the world, I was anxious to add it to our trophies.

Since wolves are wary—in fact, the most difficult animals in the North to bag—it was a problem how to accomplish our purpose. As we lived largely on the country during our spring trips, we were always equipped with a seal screen, used in stalking seals sunning themselves on the ice. I suggested to Ka-ko-tchee-ah that we place the screen in the middle of the trail, that he crouch behind it with loaded rifle, there to await the wolf while we drove on (see page 708).

The ruse worked to perfection. When we halted our teams, the wolf squatted on his haunches about a quarter of a mile away, but when he saw us drive down the fiord, he immediately jumped to his feet and followed, walking deliberately up to the screen, probably mistaking it for one of the many hummocks of ice dotting the surface.

When the animal was within 20 yards, the boy fired. The wolf wheeled, bit savagely at one of his hind quarters, and leaped backward along the trail. The boy fired again. The wolf rolled completely over, jumped to his feet, and again started off. At 50 yards he dropped. I immediately sent back Koo-e-tig-e-to with a dog team to bring up the kill.

When the two boys rejoined us, I was astounded at the vitality of the animal, for the first shot had laid bare the heart and liver and should have killed it instantly. My measurements showed that it was 6 inches higher at the shoulder and 6 inches longer than our largest dog, and weighed at least 125 pounds (see page 710).

While we were examining the wolf an exclamation of "Ta-Koo!", by E-took-a-shoo, called our attention to a herd of 15 musk oxen grazing upon a bare patch of grass about half a mile up a small valley leading from the sea ice. We immediately headed for the nearest point of land, and there pitched camp to await a more favorable light for obtaining a series of motion pictures.

This was the real object of the western expedition. Hitherto no one had ever obtained motion pictures of this strange animal, which scientists claim has come down to us from a period of 500,000 years ago.

The next noon the sun shone brightly, offering a favorable opportunity for our work. With empty sledges we proceeded cautiously up the valley to the spot where the animals were seen the day before, but they were gone.

E-TOOK-A-SHOO TRACKS A HERD OF MUSK OXEN

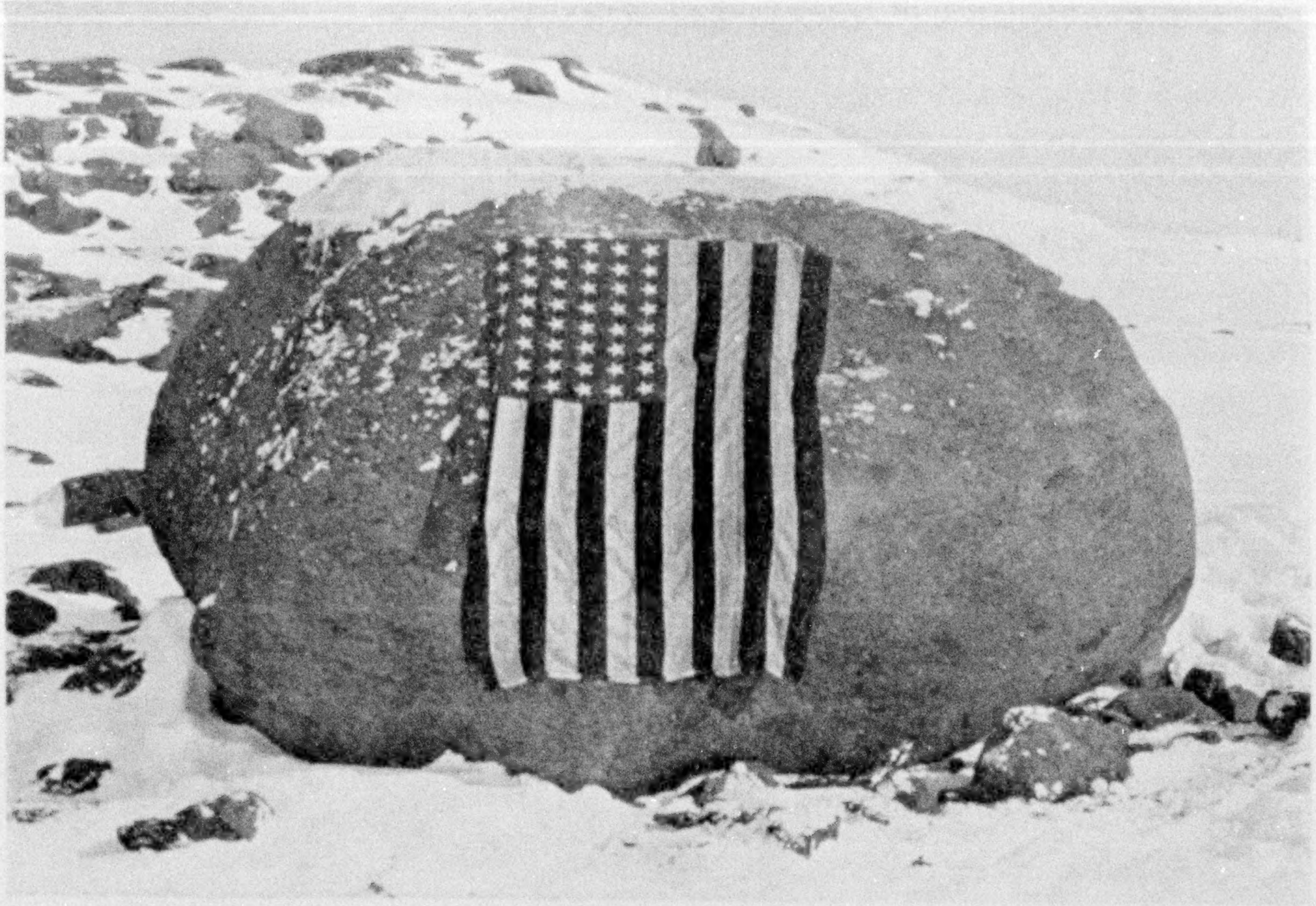
E-took-a-shoo immediately quartered the ground in every direction with his sharp eyes and examined every track, and in a few moments announced that the animals had gone over the tops of the highest hills to the west.

Not a track could be seen, and it was with reluctance that the two Eskimo boys and I consented to follow him.

After traveling an hour we ascended a high hill and E-took-a-shoo called for binoculars. After scrutinizing the land to the west, he declared that he could see the whole herd sleeping quietly on the top of a distant hill.

Upon reaching the base of the hill, where the animals were sleeping, we tethered some of our dogs to huge bowlders, knowing that, when the fight began, they would do their utmost to break from their harnesses.

It was necessary to have the aid of a few dogs to hold the musk oxen at bay while they were being photographed. Since these animals charge with great rapidity, we selected five of the most active dogs—those thought capable of avoiding sharp horns.



Photograph by Donald B. MacMillan

THE GREELY TABLET BEFORE UNVEILING: CAPE SABINE (SEE ALSO PAGE 700)

This memorial to one of the most tragic chapters in the history of American Arctic exploration is more than 700 miles above the Arctic Circle and is, therefore, one of the most northerly monuments in the world to heroism and to international scientific cooperation. One of Peary's huts is also on Cape Sabine.

On reaching the crest of the hill, the huge beasts were in full view. We released the dogs from their traces, and they shot away at full speed. We, in contrast, seemed to plod at a snail's pace, carrying the heavy motion-picture camera and the extra magazines.

The great, shaggy, black masses instantly jumped to their feet and formed a circle, heads out, tails in, and horns lowered (see pages 695 and 711).

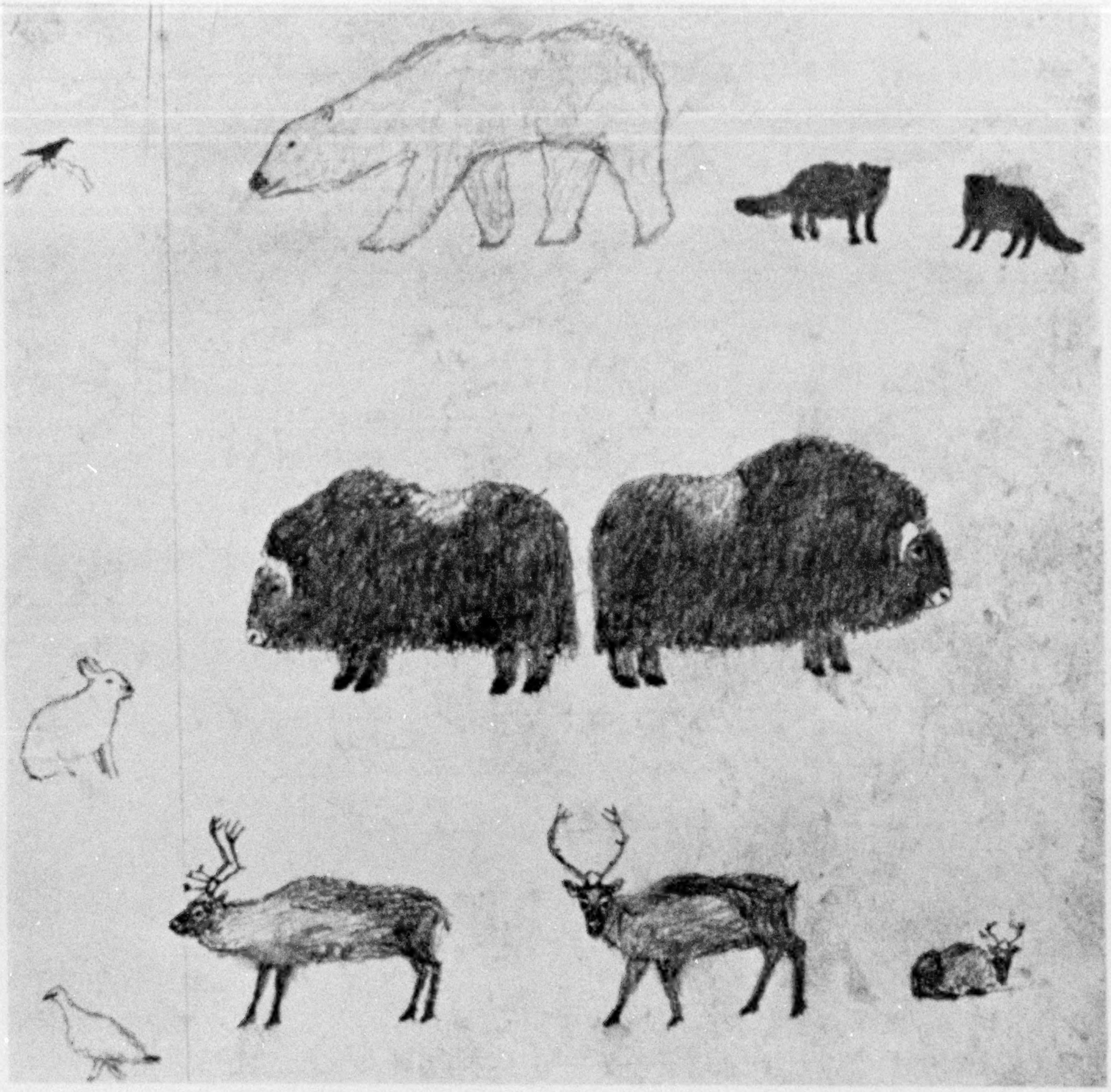
When I arrived, I noticed that nearly all of the animals facing us were rubbing the sides of their heads between their forelegs. They had never seen dogs or men, and probably thought we were a band of wolves. In fact, a white wolf seated on a neighboring mound was an interested spectator of the whole ensuing performance.

When attacking musk oxen in 1909 on the northern end of Greenland, I noticed that, upon our approach to the herd, the bulls repeatedly dropped their heads and scraped the ends of their horns upon a bowlder in their midst, as if sharpening them for an attack. But the practice of rubbing their heads on their legs puzzled me for some moments, until I concluded that they were rubbing away the frost formed about their eyes by the condensation of their breath in cold weather. They were thus able to see their assailants more clearly.

THE AUTHOR MAKES THE FIRST MOTION PICTURES OF MUSK OXEN

In several books on the Arctic, I have found elaborate accounts of how musk oxen exhibit the intelligence of a well-trained company of soldiers, forming into a perfect hollow square and charging in turn into the enemy. My motion pictures show that they are simply a huddled mass without formation. They charge without order, but always retreat immediately to the herd, as if fearful of being cut off and surrounded by the enemy.

Mothers and calves are not in the center, protected by an encircling line of bulls. All, even the little ones, face toward the point of attack. The very



Photograph by Donald B. MacMillan

NORTHLAND ANIMALS AND BIRDS, DRAWN BY A SMITH SOUND NATIVE

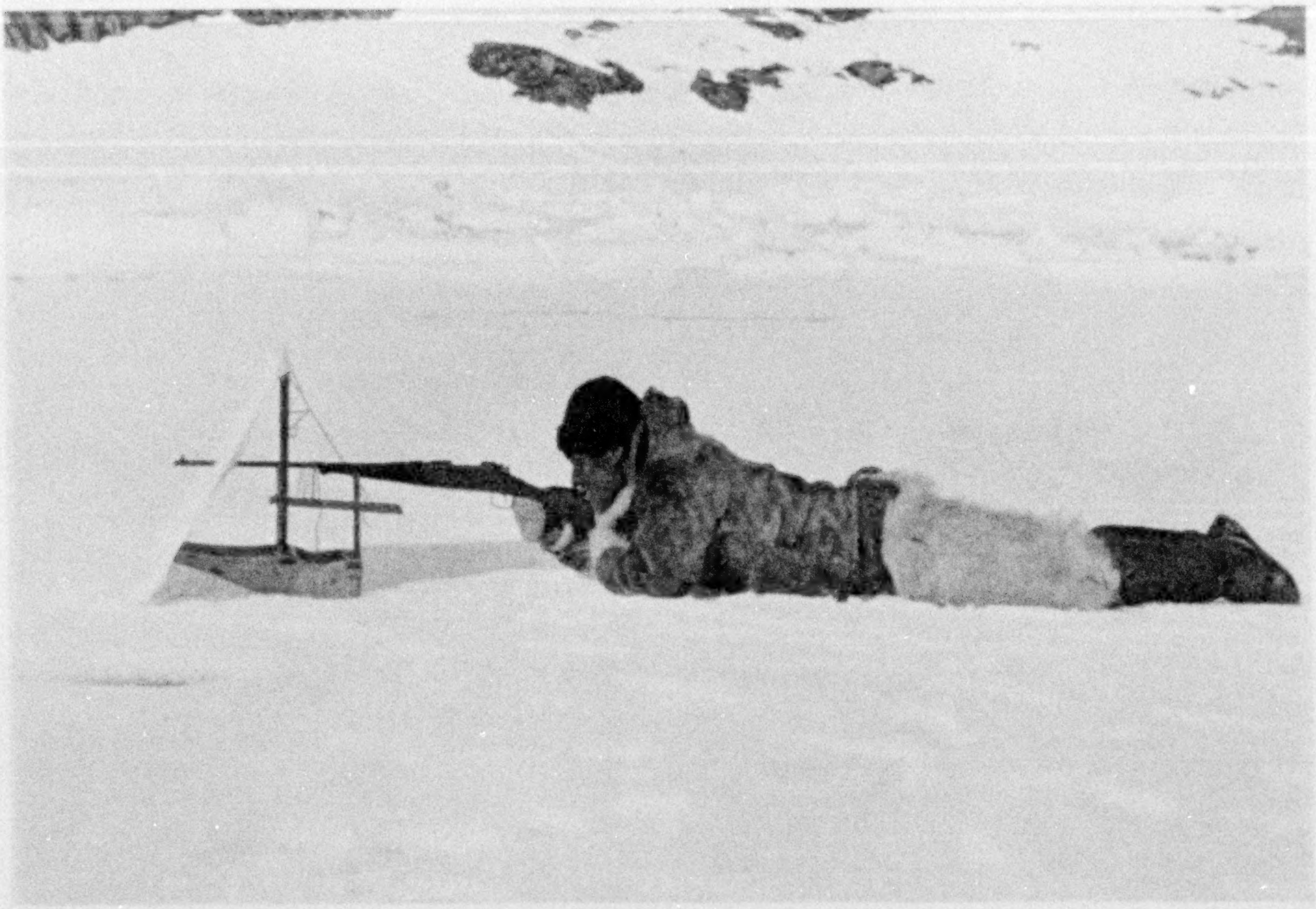
The artist, old Pan-ik-pah, was employed by Peary practically from the beginning of his work in Greenland, in 1891, until his discovery of the North Pole, in 1909. He is now 63 years old and is still active.

young, however, repeatedly hide beneath the bellies of the mothers, being almost completely concealed by the latter's long, shaggy hair, which reaches nearly to the ground (see, also, page 695).

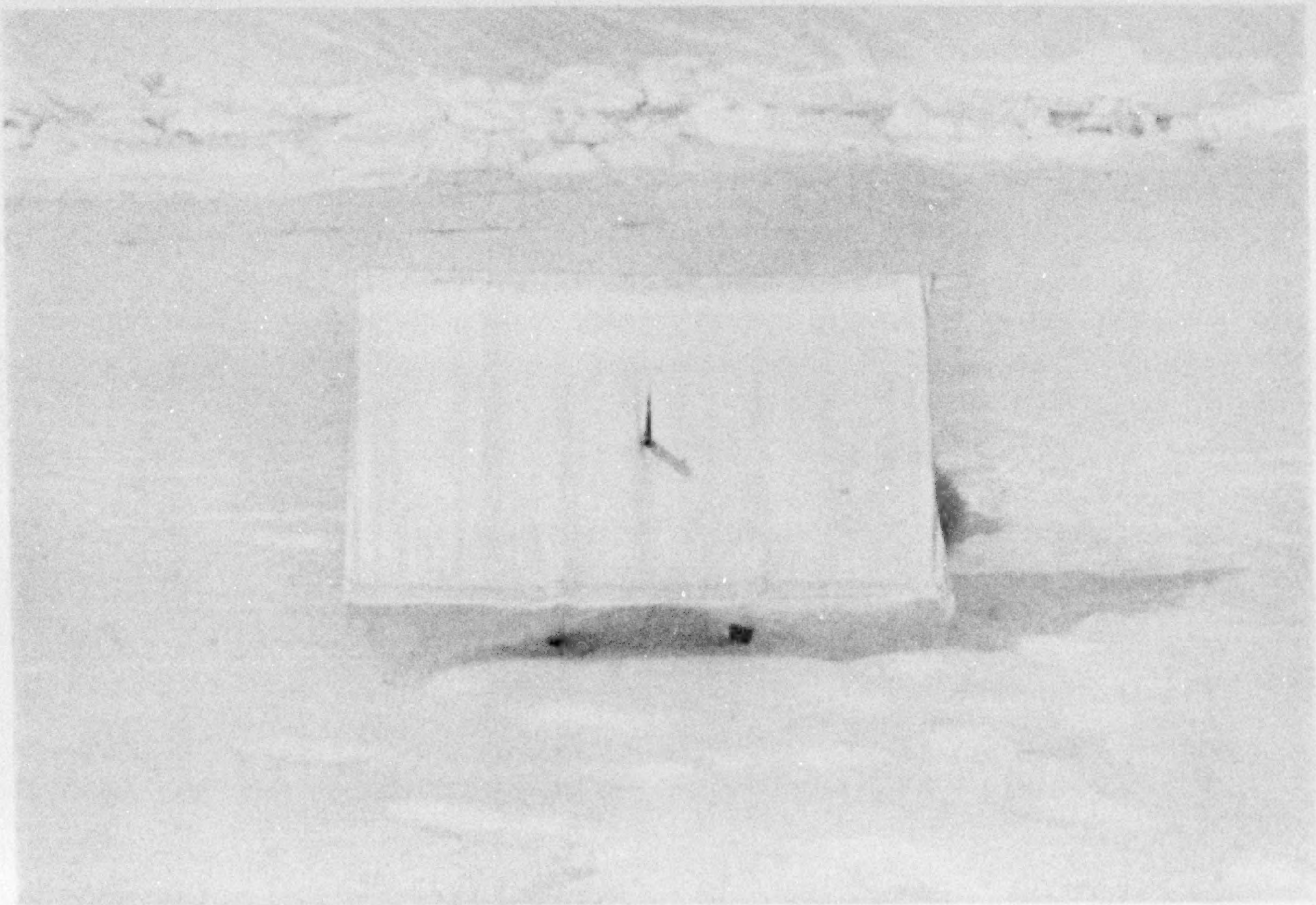
A musk ox will charge with its head very close to the ground, catch a dog on its horns with a vicious thrust, and rip him completely open. I have also seen some toss dogs into the air and crush them flat with their big heads when they strike the ground. A dog, however, is rarely caught unless hampered by the musk ox treading upon his trace as he endeavors to get away.

Musk oxen are covered with a coat of wool and long hair, which must furnish perfect protection even in temperatures as low as 75° below zero. They feed upon wind-swept patches of grass during the winter months, and, when all grass and moss are cropped, they wend their way through deep snow to other favorite feeding grounds. I have found them seeking food in snow a foot deep, pawing it away with their hoofs and removing it with their noses.

All seem to keep in fine condition, even in severest weather. We have killed them in temperatures as low as 50° below zero and found their paunches filled with great masses of frozen grass.



A SEAL SCREEN, WITH KOO-E-TIG-E-TO BEHIND IT, ON THE ICE (SEE TEXT, PAGE 705)



Photographs by Donald B. MacMillan

A FRONT VIEW OF THE SEAL SCREEN

Though the Eskimo is adept at hunting with his own weapons, it was Peary who gave them effective equipment for winning their livelihood more easily.

Incidentally, musk-ox meat is considered to be the most delicious in the Far North. It tastes a bit like good beef, and, in the opinion of some, like mutton. Apparently as large as a good-sized buffalo, the animal is pitifully small when the shaggy coat is removed.

PAINFUL SLEDGING OVER THE ICE CAP

The Eskimos, having no desire to repeat their experience undergone between the face of the glacier and the mountain, eagerly adopted my suggestion for a return trip over the top of the ice cap of Ellesmere Island, a route taken by us in 1914 and '16.

We soon encountered snow of such depth that we were compelled to exchange all of our fur clothes for woolens, the heat from our exertions in lifting and pushing the sledges being almost unbearable. Covered with perspiration and with underclothes wringing wet, we toiled painfully through the valleys and up over the high hills.

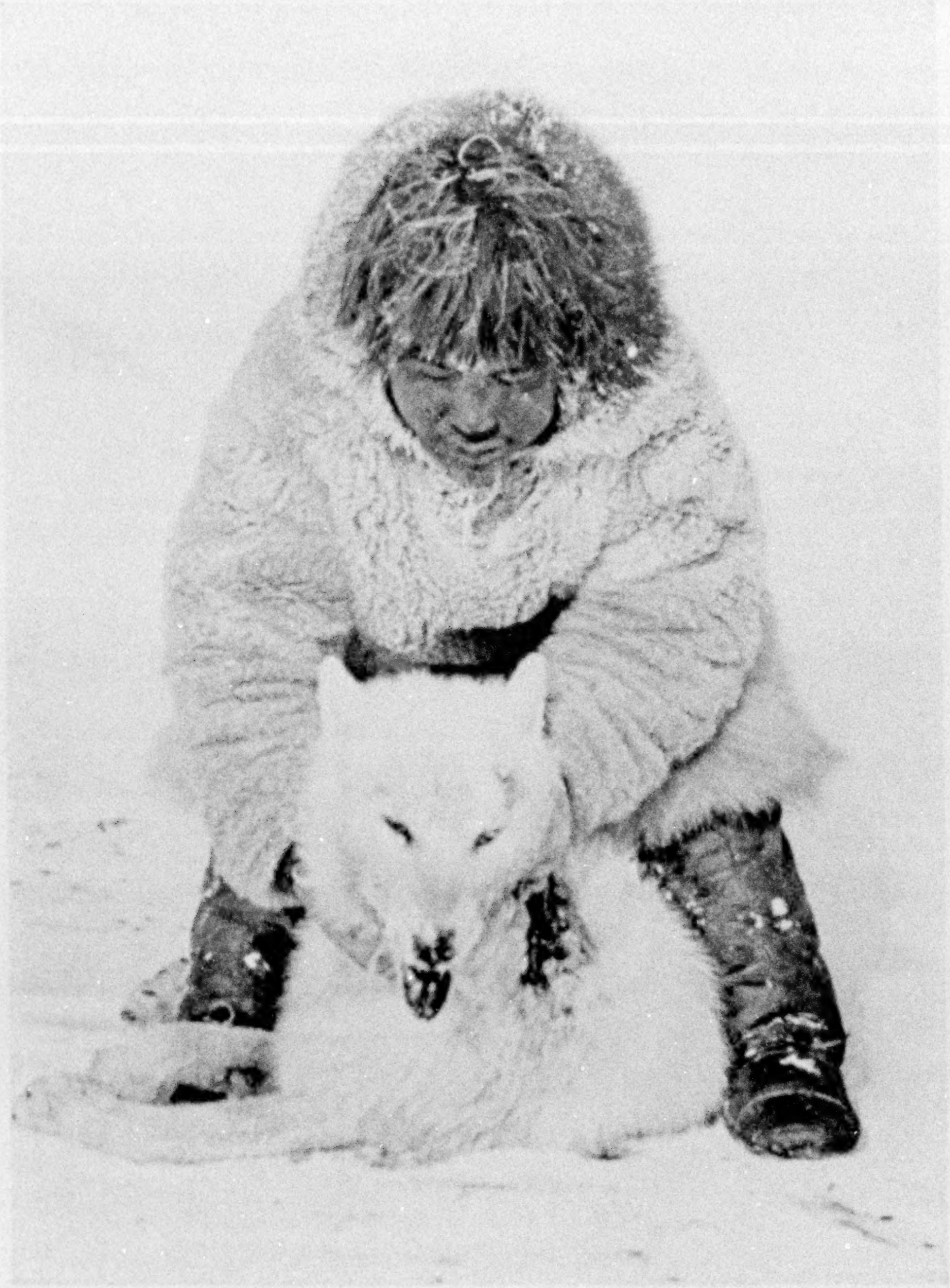
We plodded on and upward for three days, hoping to find better conditions. Dogs and men were exhausted at the end of each day.

Finally we encountered one steep snow-covered hill, which stopped the two younger boys completely. E-took-a-shoo and I, having better dogs, succeeded in reaching the summit, and wondered if the others could possibly make it.

These primitive men, without books, schools, or written language, are fully as resourceful as the white man. They will generally get out of a difficulty. I could hear the boys yelling at their dogs and snapping their long rawhide whips, before their heads appeared over the summit of a distant rise.

They had harnessed all their dogs to one sledge. Koo-e-tig-e-to was driving and Ka-ko-tchee-ah was walking immediately in front of the dogs, encouraging them by dragging under their noses a big piece of meat on the end of a string! Puffing and perspiring freely, they reached the top of the hill.

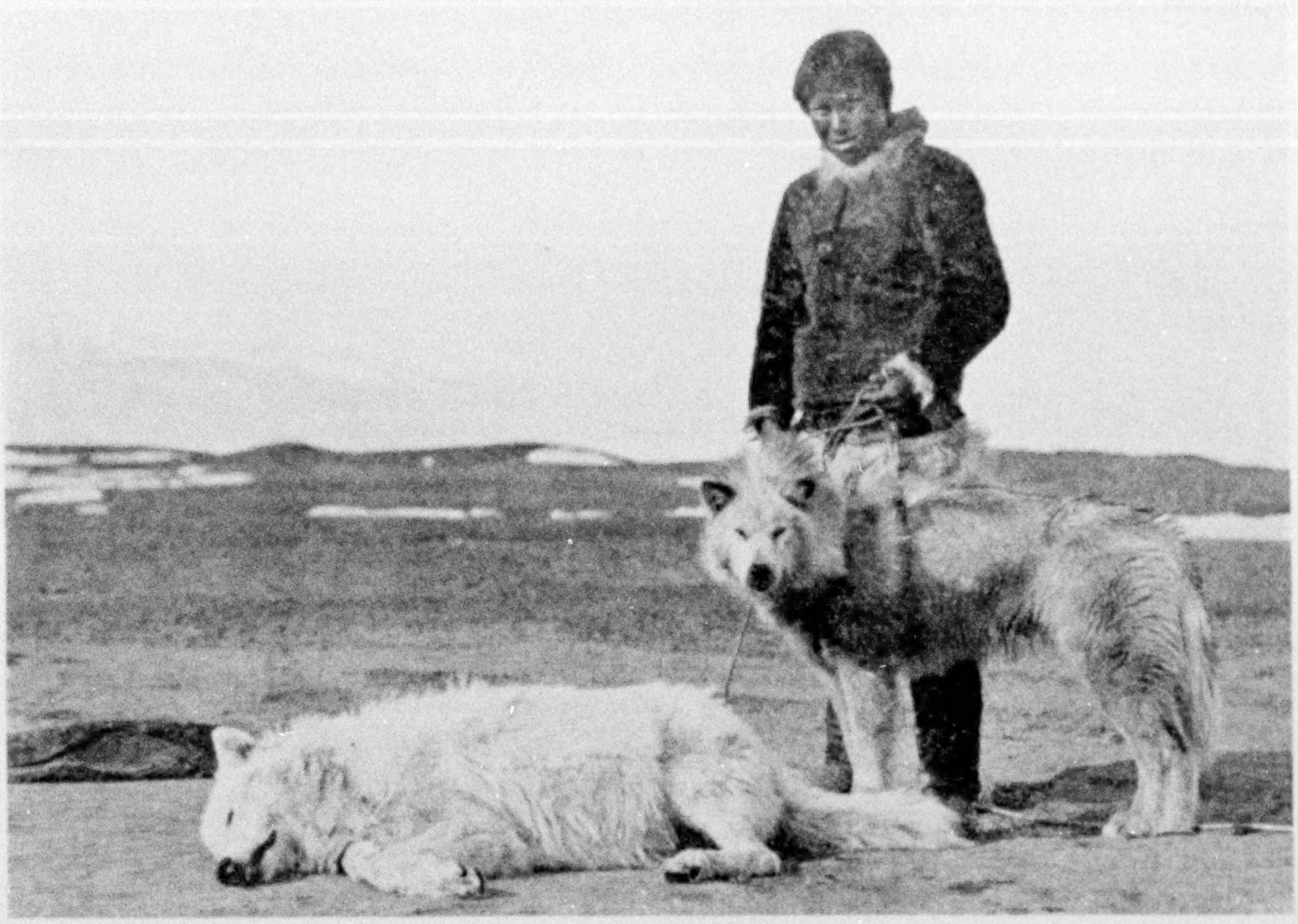
The next day we encountered even worse sledging conditions. Thoroughly disgusted with our new route, we decided to give it up, count our three days' work



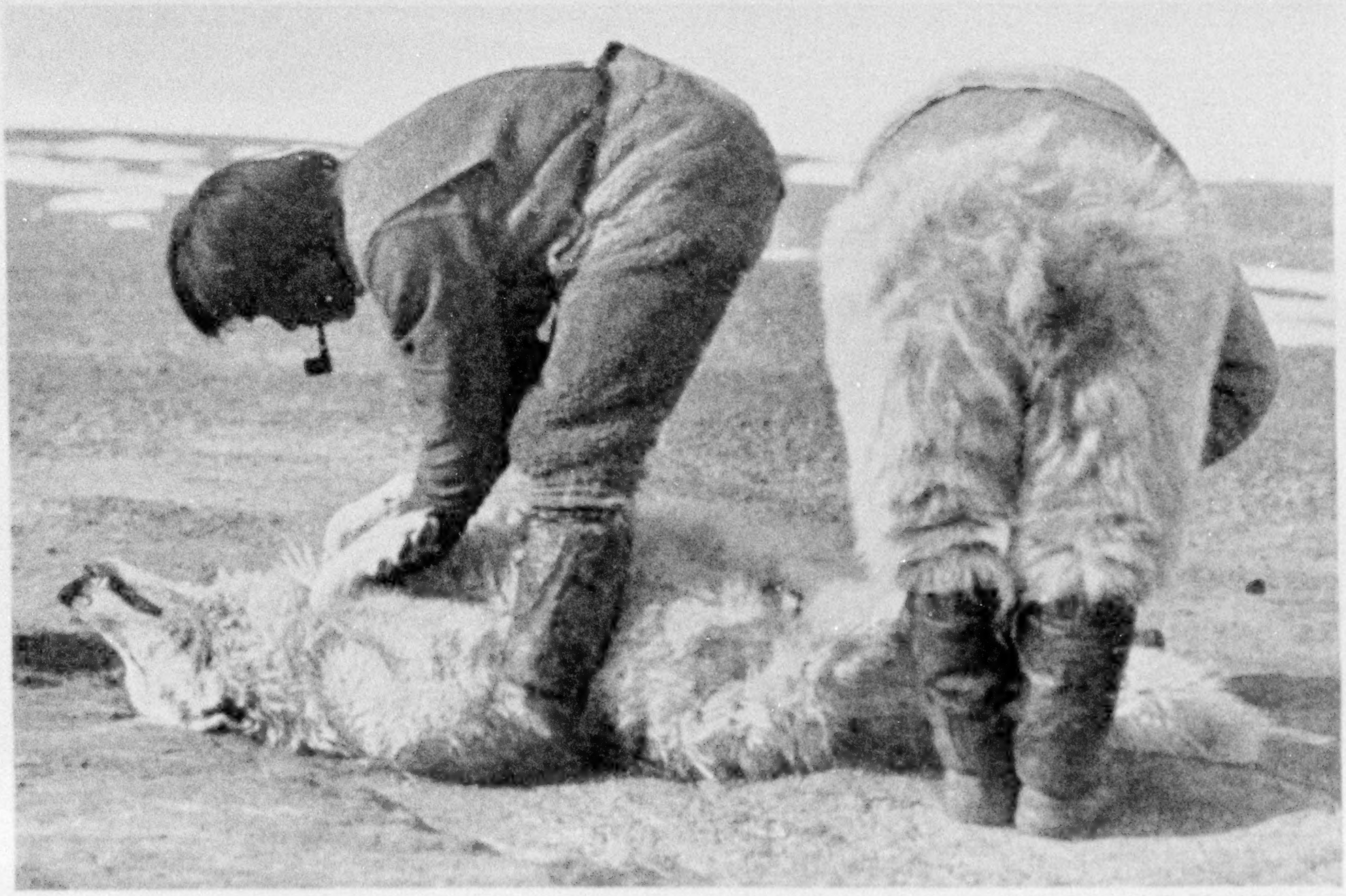
Photograph by Donald B. MacMillan

A WHITE WOLF SHOT IN EUREKA SOUND

Only a few specimens of this species are to be found in museums of the world (see text, page 705).



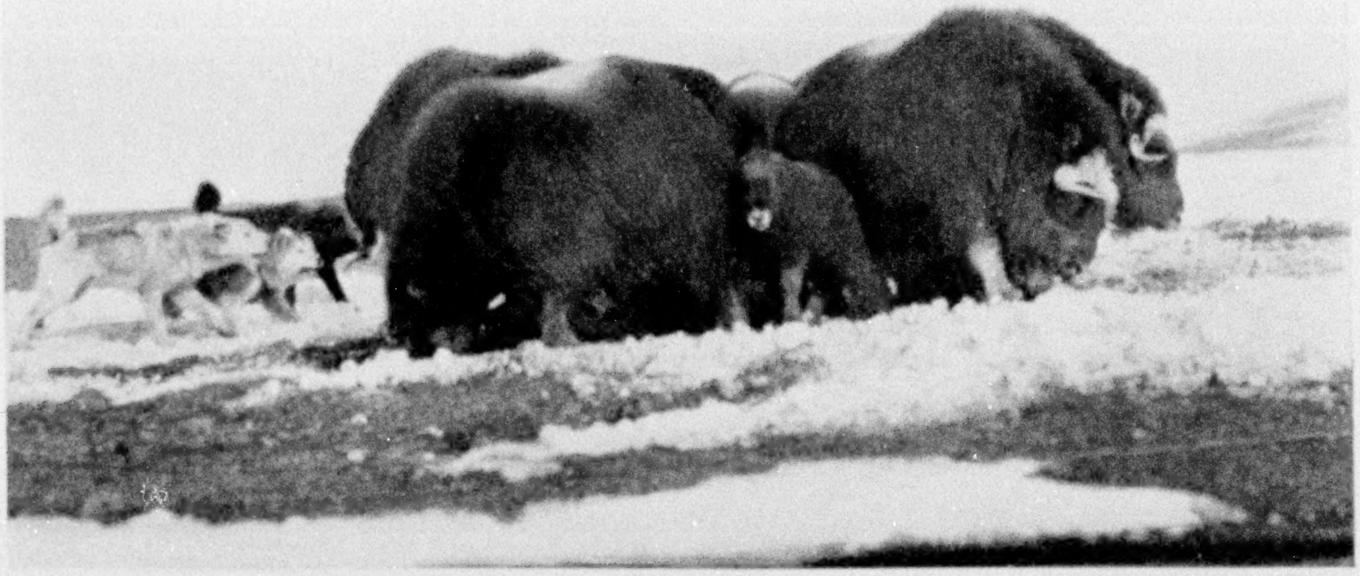
KOO-E-TIG-E-TO AND A DEAD WHITE WOLF, WITH THE ESKIMO DOG "GRANT"



Photographs by Donald B. MacMillan

E-TOOK-A-SHOO AND KOO-E-TIG-E-TO SKINNING A WOLF: BAY FIORD

This wolf, shot by means of the seal screen (see illustrations, page 708, and text, page 705), was larger than a good-sized dog. The white wolf is more enduring, has a wider range, and passes an easier existence than any other Arctic animal. It infests Axel Heiberg Island, where its tracks mingle with those of musk oxen and caribou.



Photograph by Donald B. MacMillan

MUSK OXEN OF BAY FIORD FACE THE DOGS AND CAMERA (SEE, ALSO, ILLUSTRATIONS, PAGES 694 AND 695)

The meat of these remarkable animals, which keep in good condition throughout the severe winter weather, has been compared to beef and sometimes to mutton. Note the calf huddled against its protecting elders.

as wasted, return to the head of Bay Fiord, and go home by the old route, in spite of the danger of falling ice.

THE ESKIMO DOG OF THE FAR NORTH FEARS THE WATER

The following two days are memorable. I have never known my men to be so completely exhausted on any of our spring trips. The warm sun of the past few days had converted every compacted snow bank into a mushy mess and removed every vestige of snow from the river bed leading back to the face of the glacier. Not only did bare ground hinder progress, but the water in the river bed was at times over the slats of our sledges. We were compelled to unlash, unload, and carry everything on our backs for miles.

The Eskimo dog of the Far North is mortally afraid of water, and only under the stinging lash of the long whip will he consent to wade through it, especially in low temperatures.

Cutting holes for our toes so that we would not slip, we laboriously worked the teams up the face of the glacier, thence along the bottom of the ice-covered ravine, between the face of the ice and the mountain. From there on, it was a struggle to drive our sledges through the grit and gravel of the hills to the sea ice at the head of Flagler Fiord.

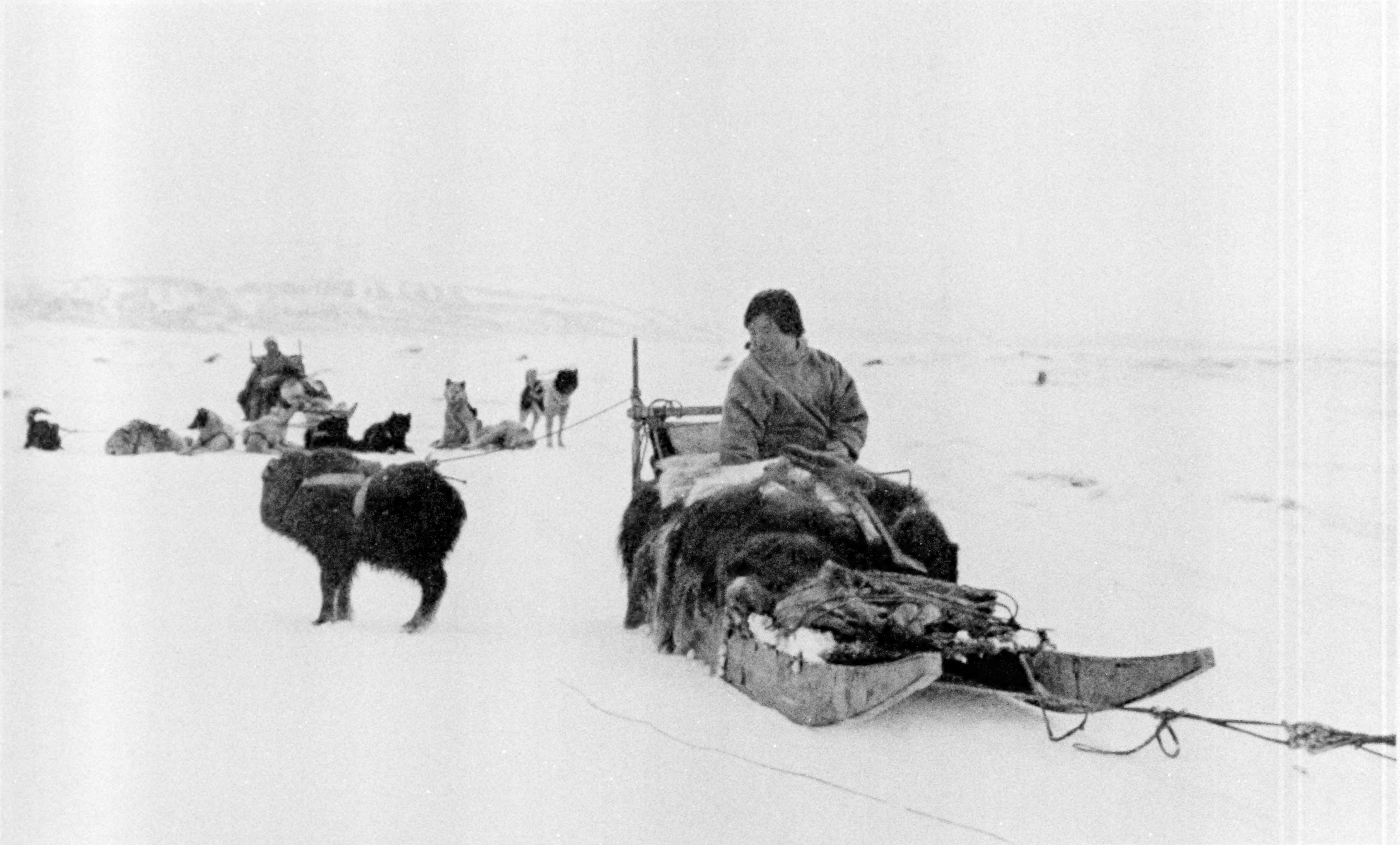
Our nicely polished runners were scarred deep by the rocks, and the soles were ripped from our boots.

With genuine expressions of relief we drove on to the hard ice of the fiord. We had not only left land and rocks behind, but were now in touch with seals sunning themselves on the surface of the ice. Our dogs had not been fed for five days.

Within an hour E-took-a-shoo killed two seals, and our dogs were filled to the neck. In the warm sunlight we sat contentedly round the boiling pot filled with hearts, livers, and tenderloins. At such times hardships of the past are soon forgotten, and pleasures of the long trail accentuated.

Upon reaching the mouth of Flagler Fiord, we were astounded to see a great expanse of open water, an unusual condition at that time of year. It compelled us to travel on the ice foot close to the land, watching for an opportunity to cross to the solid ice of Buchanan Bay.

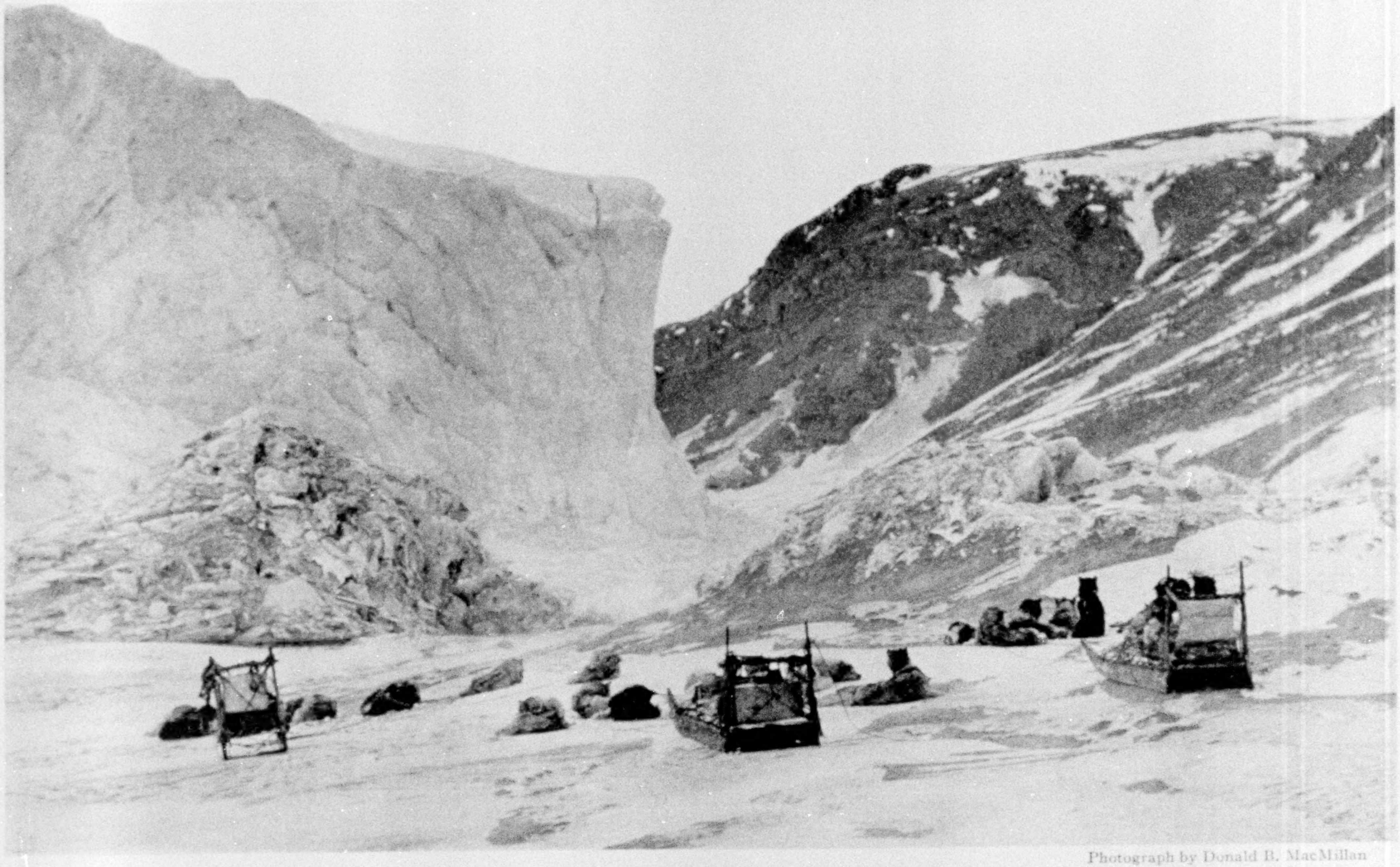
Our disappointment was somewhat



Photograph by Donald B. MacMillan

A YOUNG MUSK OX TIED TO E-TOOK-A-SHOO'S SLEDGE

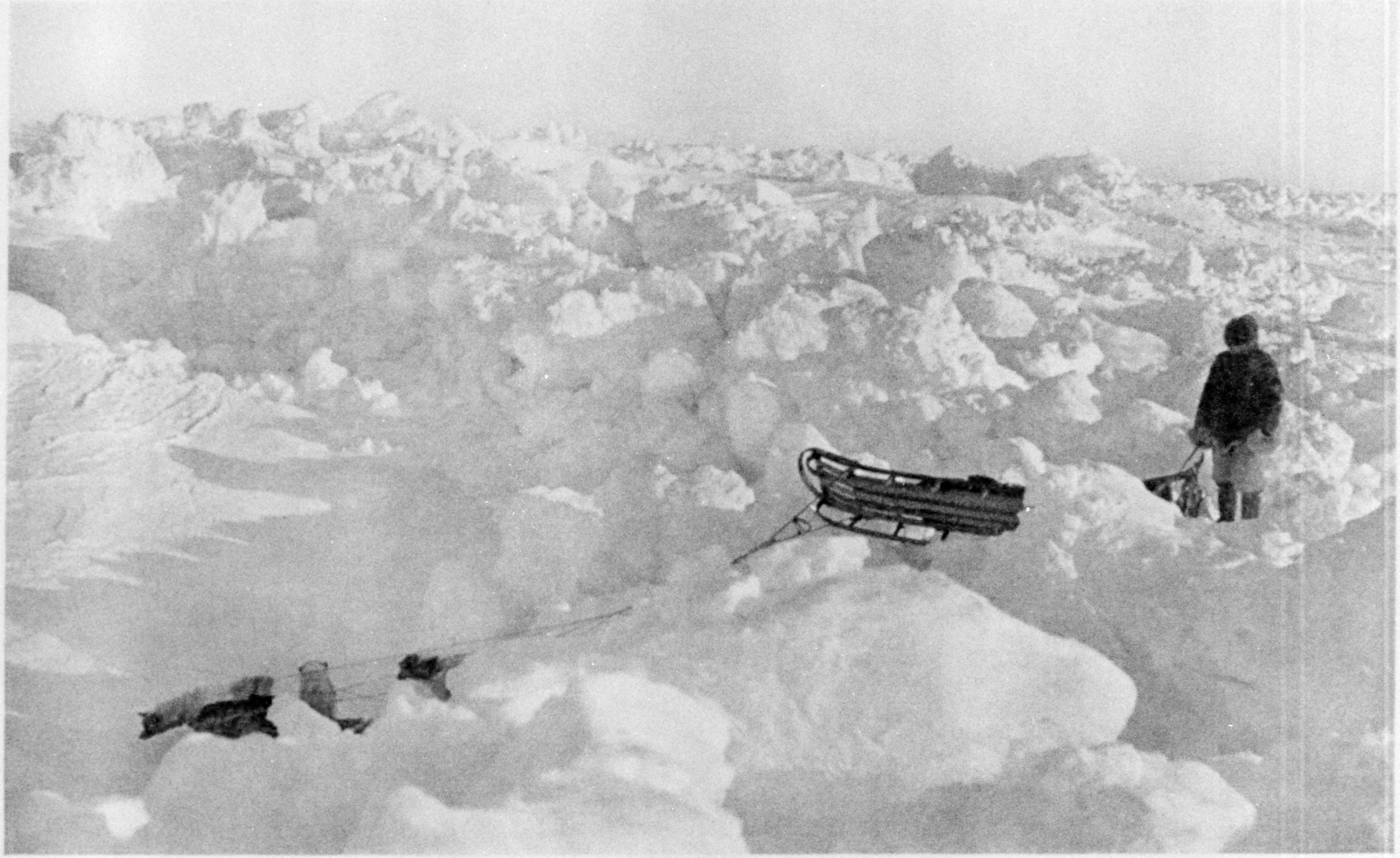
MacMillan pays to this native dog driver, who has served with him on several expeditions, the tribute "the best Eskimo I have ever employed."



Photograph by Donald B. MacMillan

CONFRONTED BY REID GLACIER ON THE MUSK OX TRIP TO EUREKA SOUND

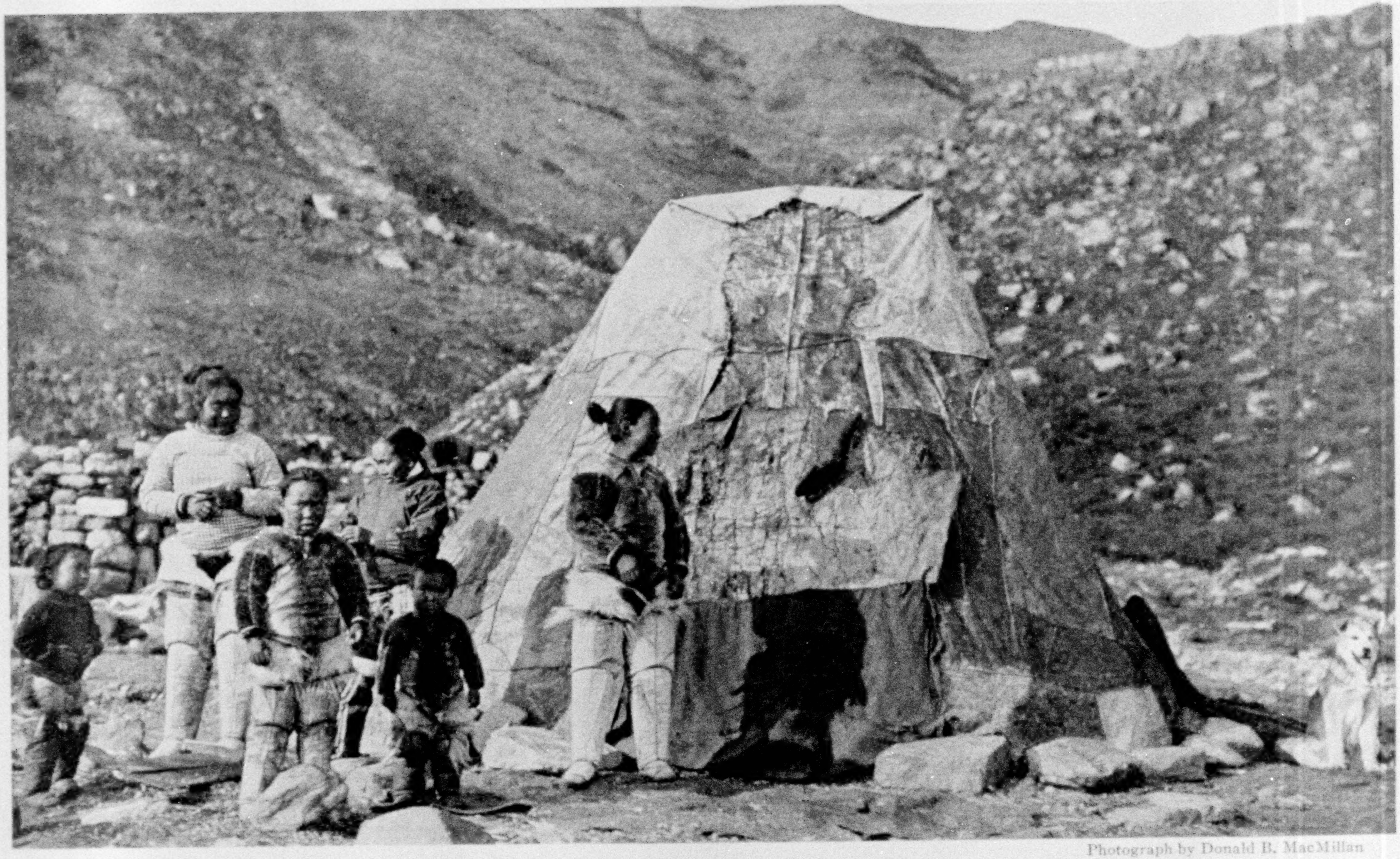
XUM



Photograph by Donald B. MacMillan

ROUGH ICE IN THE POLAR BASIN 100 MILES NORTHWEST OF AXEL HEIBERG ISLAND

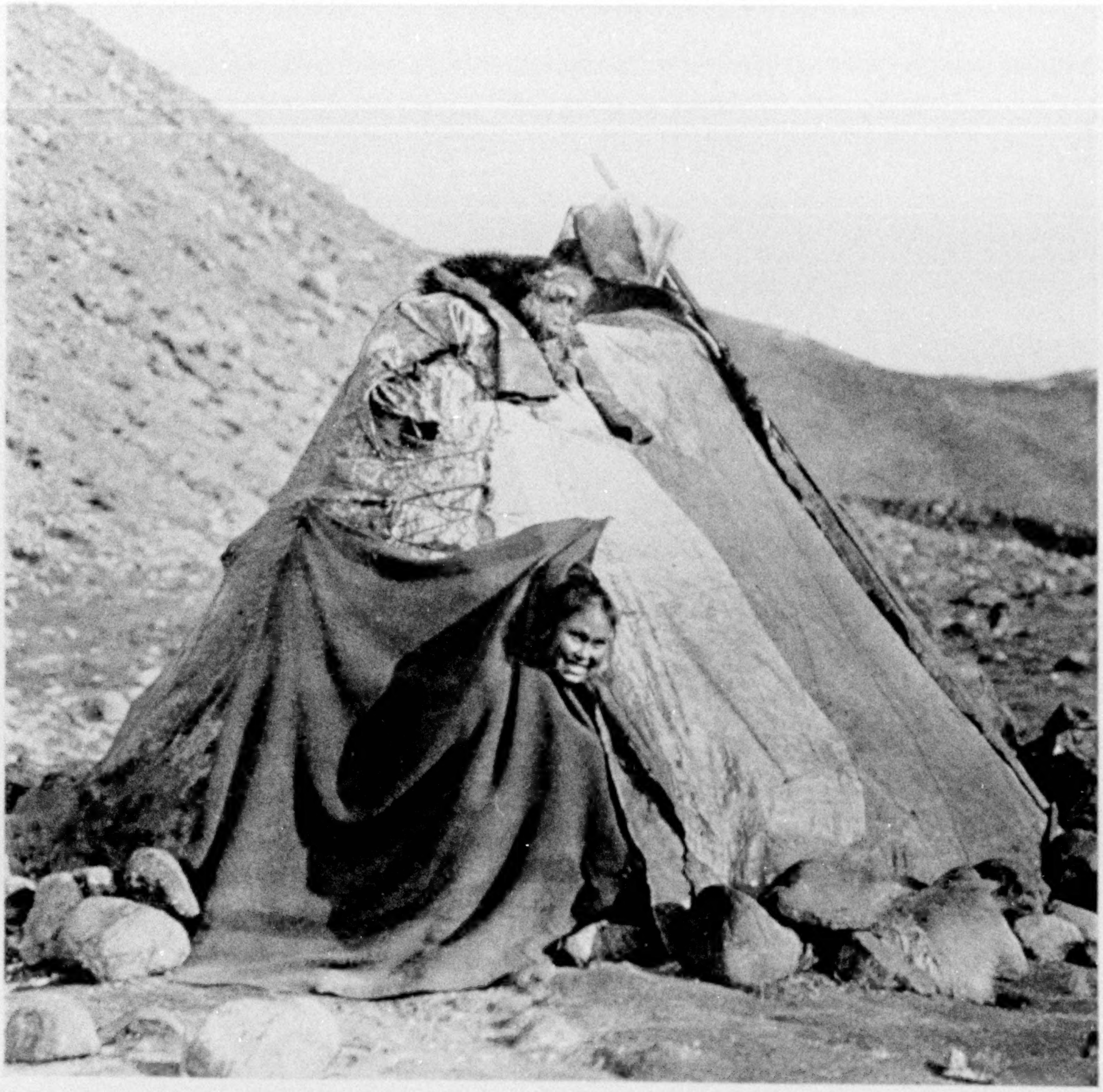
This illustration provides one answer to the question why it took man more than 300 years to reach Farthest North.



Photograph by Donald B. MacMillan

THE SUMMER HOME OF A SMITH SOUND ESKIMO FAMILY: NERKY

The sealskin *tupik* is well built and is ideally shaped to resist gales from the big hills. The covering is braced by numerous poles and held down on the outside by a ring of heavy stones. Nerky (Meat) is an Eskimo settlement 60 miles by sledge south of Etah (see text, page 687).



Photograph by Donald B. MacMillan

PEEPING FROM HER TUPIK (SEE, ALSO, PAGE 715)

Ringed and bearded seals, besides furnishing this tent material, are useful in other ways. The skin of the ringed seal makes summer coats and boots; the tough skin of the bearded, or thong, seal makes an excellent sole for the *kamik*, the boot of the Smith Sound native. The meat of the seal is "the Eskimo's turkey, his staple food; a seal's flipper is his entrée, and a frozen seal's liver his ice cream." The skin tupik of summer gives way in winter to an igloo built of stone, and in the spring, or when traveling, to one of cut blocks of snow.

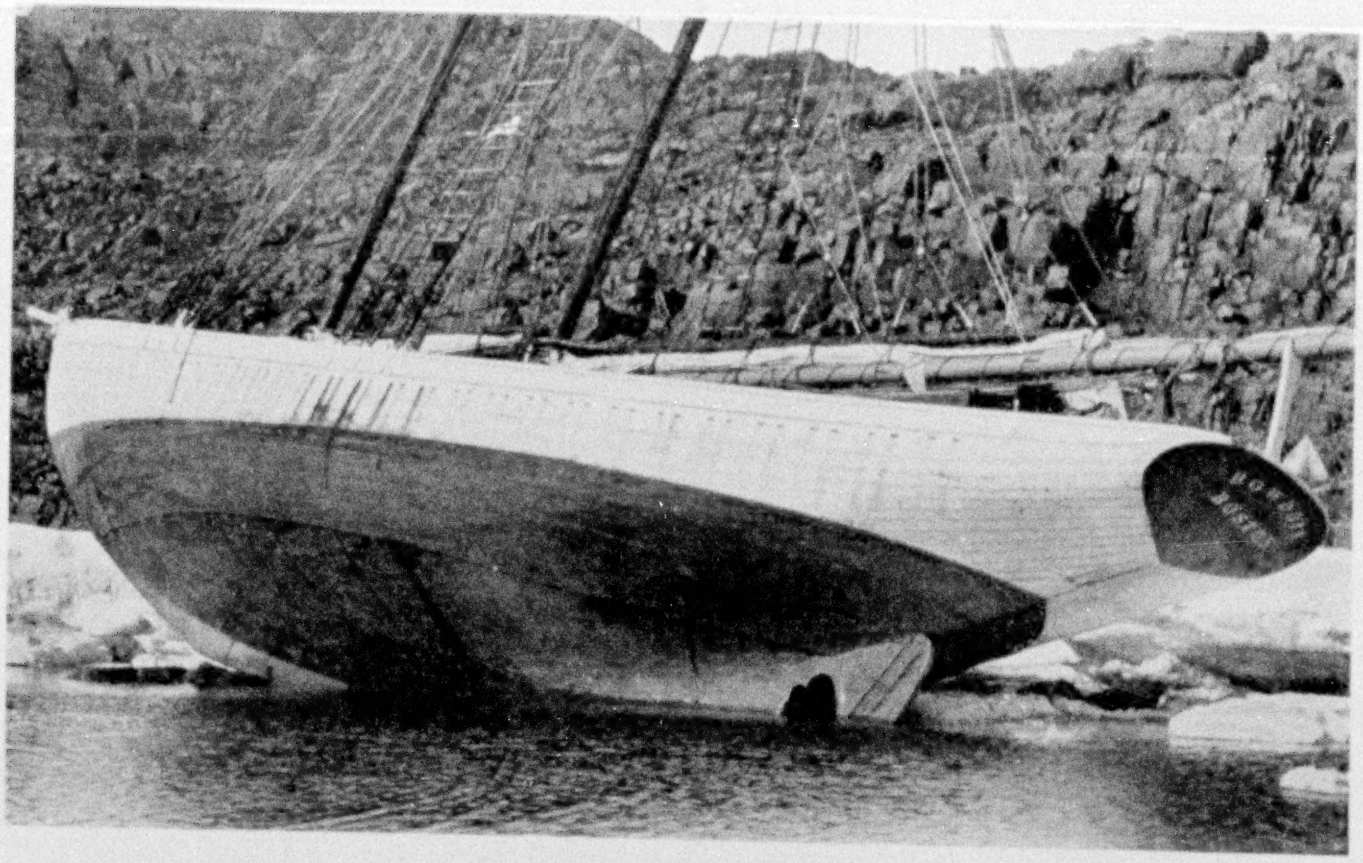
relieved by the first real signs of spring. The water was dotted with long-tailed and eider ducks, sea pigeons, and glaucous gulls.

EIGHTY MILES ACROSS HARD, BLUE ICE

Making a bridge out of ice cakes brought to us by the incoming tide, we succeeded in reaching the bay ice, which stretched continuously for some 80 miles to the little *Bowdoin*, in Refuge Harbor. Once through the deep snows of Buchanan Bay, we drove rapidly over the hard, blue ice of Smith Sound, reaching Point Cairn, half a mile from the ship, at midnight on June 1.

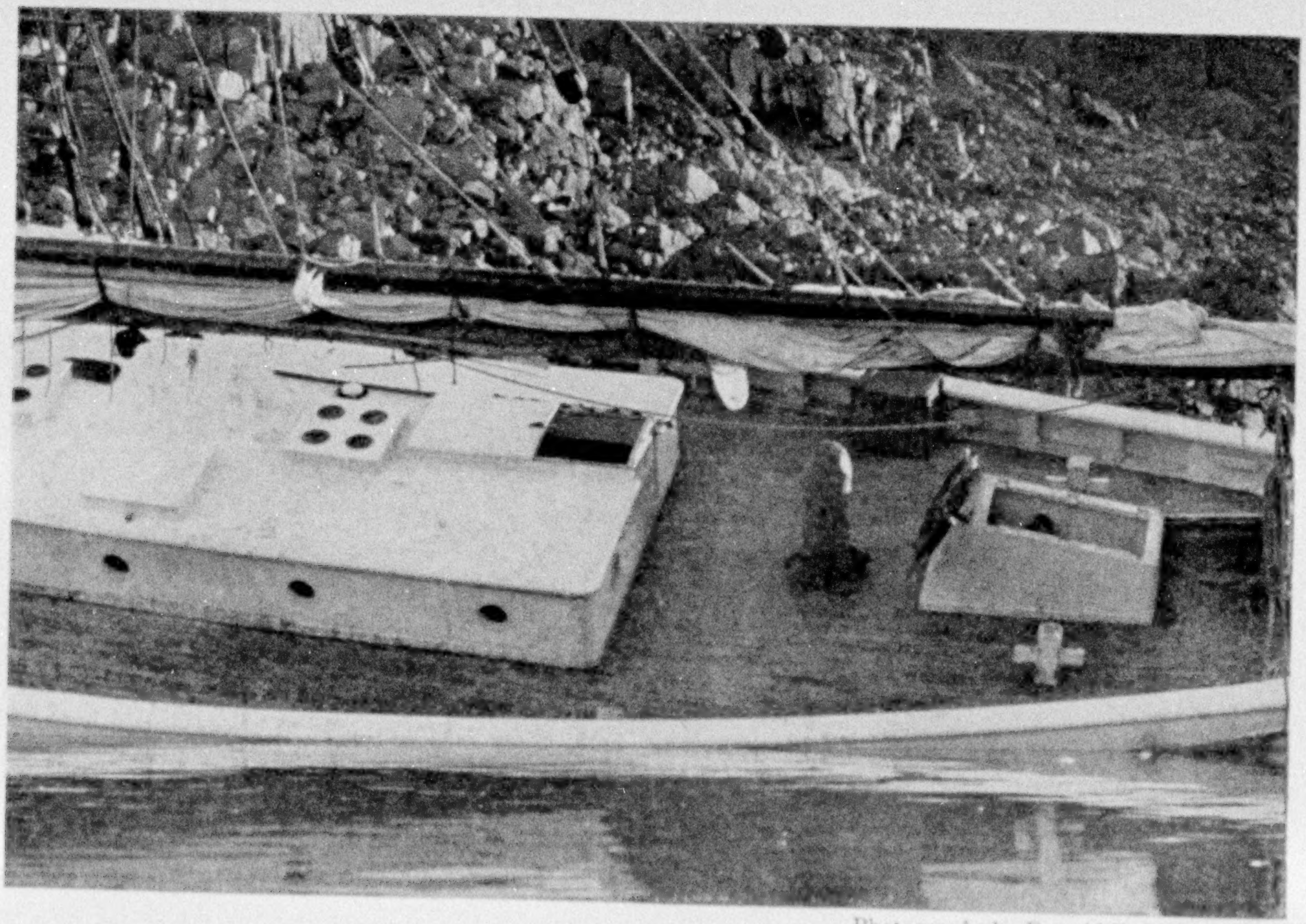
Here again we were delayed by open water caused by tides swirling out of Kane Basin.

Leaving our sledges on the ice foot on the back side of the point, and leading our tired dogs, we ascended the rocky hills surrounding the harbor. Upon reaching the familiar ice point 500 feet above the ship, the dogs wagged their tails and bounded away.



IN A PRECARIOUS POSITION: REFUGE HARBOR

In attempting to leave the harbor, the *Bowdoin* ran upon a pinnacle of rock at high tide. Realizing that at low water the ship would fall upon its side and possibly fill, an attempt was made to keep it upon even keel by running masthead lines to cliffs on the starboard side and to anchors imbedded in the ice on the port side (see text, page 720).



Photographs by Donald B. MacMillan

THE "BOWDOIN'S" RAIL LEVEL WITH THE WATER: REFUGE HARBOR

When some of the ropes snapped, the vessel keeled to port and water poured over the rail. After relieving the ship of all possible weight, the members of the expedition pulled it over on the starboard side and finally succeeded in floating it (see text, page 721).

Photograph by Donald B. MacMillan

ME-GISH-OO (SEE, ALSO, PAGE 676) AND SHOO-E-GING-WA ARE PLAYING WITH PUPPIES ON FATHER'S BIG BEARSKIN

The full-blooded Eskimo dog is one of the most affectionate of pets.

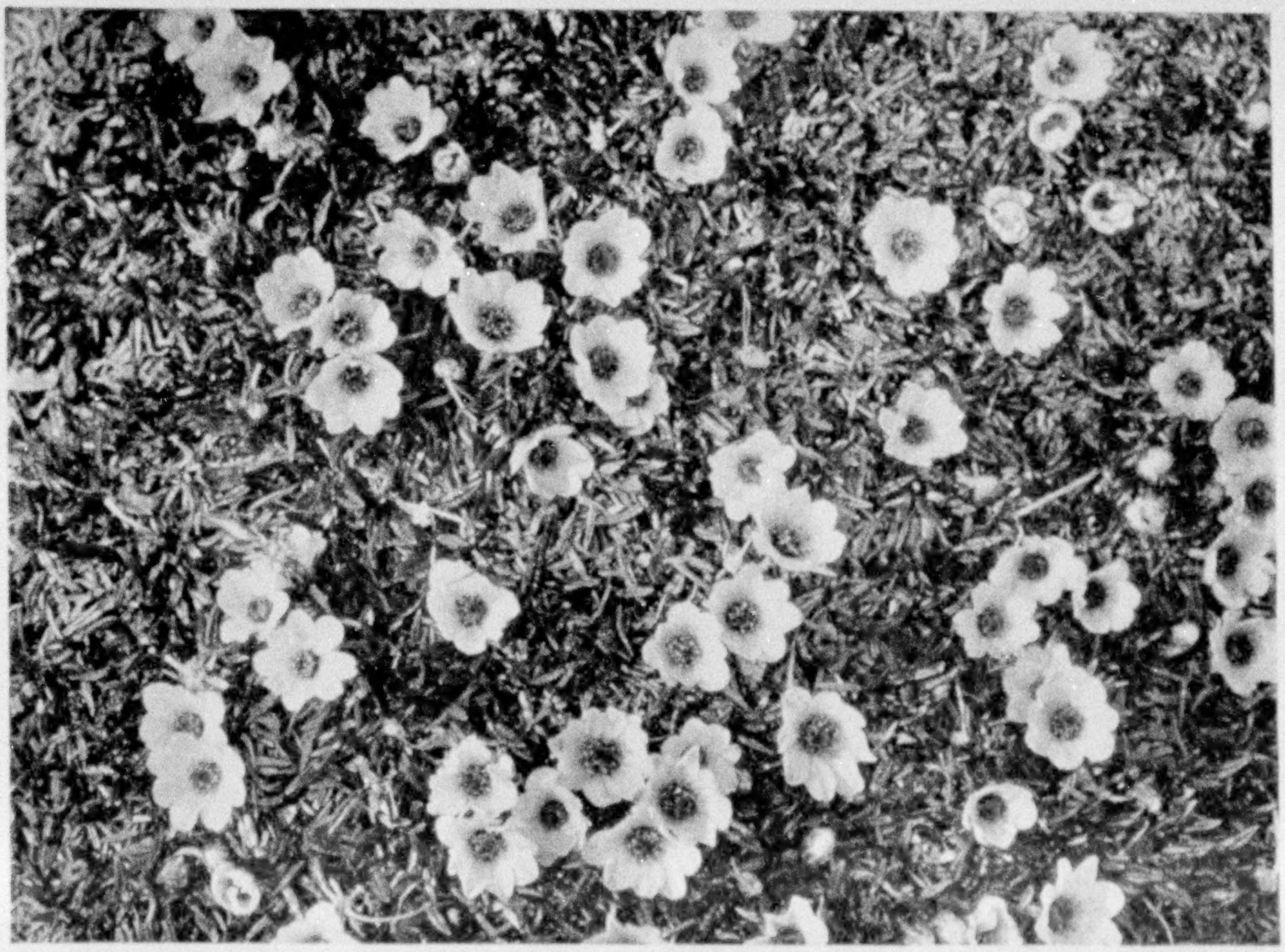
The ship at this time presented a welcome picture to us. The three snow houses upon her decks had melted away, the protecting snow wall had fallen down—summer had come.

Every good day was now utilized in hunting seal and walrus, and in packing away meat for the following winter, since there was always a possibility that our harbor would not melt out and that the ship might be detained for a second year. Trips were planned to Littleton Island, 15 miles to the south, where we often picked up 4,000 fresh eider ducks' eggs in three hours (see page 685).

Some 36 kinds of birds return to the Far North in the middle of May, and leave the latter part of September. They furnished us with an abundance of food.

In July all southern slopes were green with grass and covered with flowers. It is not generally known that, in this land supposed to be continually covered with ice and snow, botanists have collected more than 700 different kinds of flowers. In fact, flowers are found just as far

GATHERING FLOWERS AT FOULKE FIORD, 700 MILES FROM THE NORTH POLE



Photographs by Donald B. MacMillan

THE COMMONEST FLOWER OF THE NORTHLAND

The starry blossom of *Dryas integrifolia,* of the rose family, is found almost everywhere in the Far North during the summer. It is white, with a yellow center.

XUM

Photograph by Donald B. MacMillan

TAH-TAH-RAH TAKES AN ARCTIC SUN BATH

This "costume" is not uncomfortable for Smith Sound children in August.

north as land goes—380 miles from the North Pole.

THE SHIP IS FREED FROM A 330-DAY IMPRISONMENT IN THE ICE

On July 29, we hoisted our flags and decided to make an attempt to break through the harbor ice, where we had been imprisoned for 330 days. I had carefully sounded every foot of the way and knew that the *Bowdoin,* with her 10-foot draft, could make it, if not prevented by the thickness of the ice.

Just before we started off, the wind changed directions, and the harbor ice moved some 10 to 14 feet to the north. Our channel between the ice and the land was thus so narrowed that, upon endeavoring to round a point of ice, we touched, at about high tide, upon a pinnacle of rock.

In spite of all our efforts to dislodge the vessel with engine and strong lines, we stuck fast.

Realizing that upon dead low water the ship would fall flat on its side and probably fill, it was necessary to hold it up, if possible, upon an even keel. Therefore we ran masthead lines to the cliff on the starboard side, and to anchors imbedded in the harbor ice on the port side. We succeeded in our attempt for about five hours, at which time the *Bowdoin* seemed to be completely out of water and perched upon a rock about midship (see page 717).

Then without warning came a cracking and finally a snapping of the ropes leading to the cliff, and away went the vessel down upon her port side. The water poured over the rail and splashed against the cabin house.

Everything, even two of my men, went flying off the deck and disappeared beneath the water. Considering the fact that the harbor water was three degrees below the freezing point of fresh water, the unfortunates lost no time in coming to the surface and struggling to the edge of the ice.

Realizing that the *Bowdoin* might fill on the succeeding flood tide and be lost, we relieved it of all possible weight. We dropped both anchors and 90 fathoms of chain under the bow, emptied all water tanks, and cleared the hold. As a further precautionary measure, we screwed up, as tightly as possible, all portholes on the port side and caulked the after companionway.

As a result of this fall, the *Bowdoin* crushed one plank on the port side.

The next day we deliberately pulled the ship over on the starboard side. This resulted in two more crushed planks, but, since the bottom was reinforced with 22 tons of cement, I knew that this injury would not materially affect the safety of our voyage home.

A MILLION-TON ICEBERG BLOCKS THE HARBOR

On the morning of August 1 we succeeded in floating the ship and, with 15 Eskimos and 75 dogs, started for the harbor mouth.

When we were within 30 yards of the entrance a huge iceberg, weighing perhaps 1,000,000 tons, came sailing with wind and tide and blocked the harbor completely. With a large ice-saw we worked for three hours upon a neck of ice impinging upon the berg. Then, at full speed, the *Bowdoin* bucked this neck, cracked it, and slowly worked out through the mass of drift ice beyond. At last we were free, having been prisoners since September of the preceding year.

The violence of the wind was such that we should have anchored under the first protecting cape. Glad to be out, however, we bucked at full speed into a heavy head sea for 15 miles south to Etah.

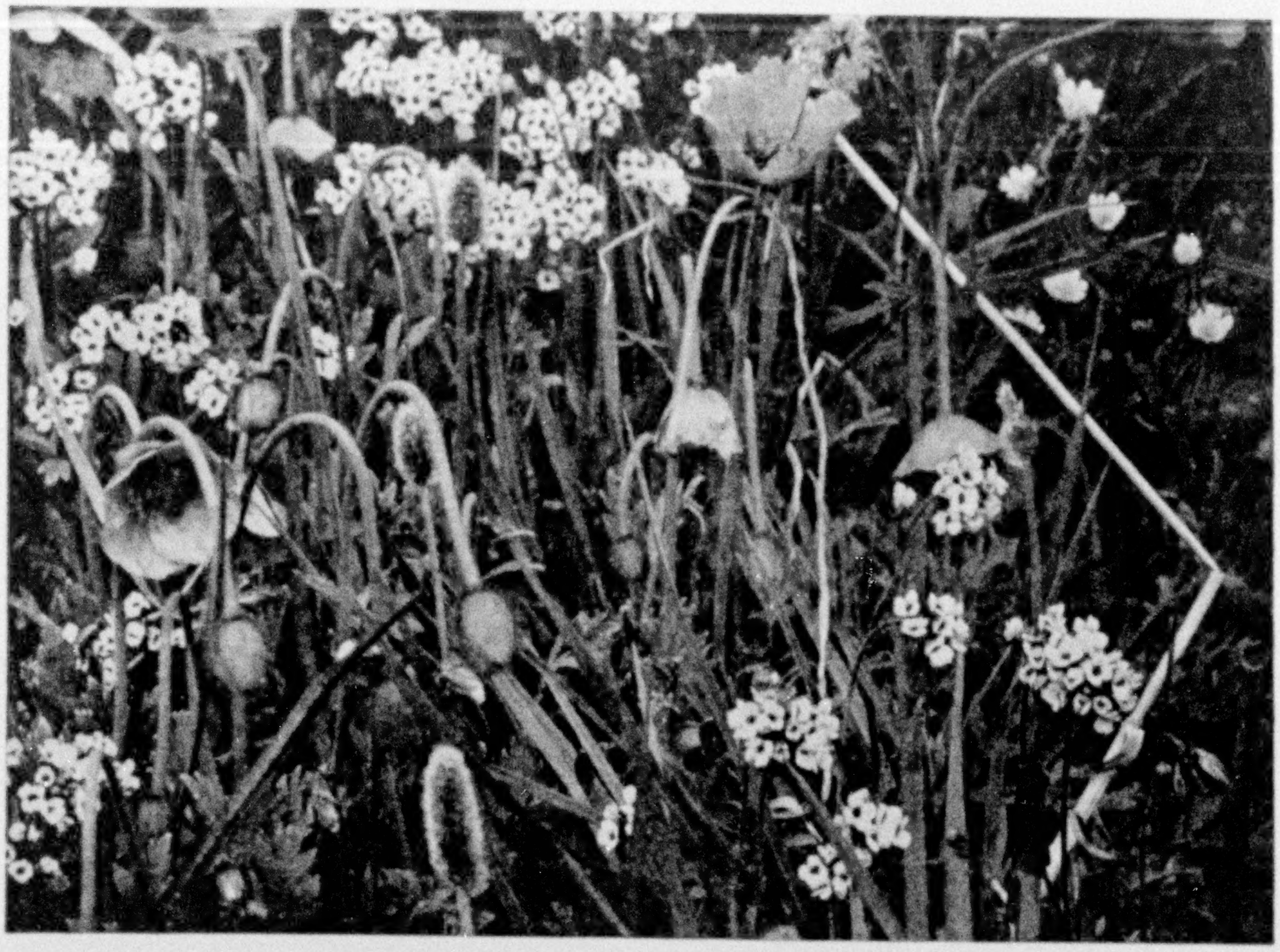
Photograph by Donald B. MacMillan

TWO YOUNG SNOW BUNTINGS TAKEN IN THEIR NEST AT REFUGE HARBOR

The little Kop-a-noo of the Eskimos nests in northern Greenland and Grant Land. It is very musical during the breeding season.

Nearly all of the Eskimos were seasick, with the exception of Koo-e-tig-e-to, who twisted a rope so tightly around his stomach that he could hardly breathe. Where the boy got the idea I do not know, but the drastic method proved highly efficacious.

Anchoring at Etah, we found the Eskimos busily engaged on the cliffs in netting little auks, which swarm there literally in millions. Each time a native sweeps the air with a 12-foot dip net he captures from one to five birds, which he puts into a sealskin bag. These grace many a feast during the winter, when



Photograph by Donald B. MacMillan

HARDY BLOSSOMS WITHIN 12 DEGREES OF THE NORTH POLE

This bed contains five varieties of blooms. The bright Arctic, or Iceland, poppy (*Papaver nudicaule*) is a nomad, being found everywhere in the Northland, blossoming even at the edge of the Polar Sea, at Cape Morris Jesup. Characteristic grass of the slopes where the little auk nests is the Arctic timothy or alpine foxtail (*Alopecurus alpinus*), also used by the Eskimo as boot padding, mattress, dishcloth, and towel. The Arctic arnica (*Arnica alpina*) resembles a small sunflower in habits and appearance, and the alpine everlasting (*Antennaria alpina*), its southern cousins. The rose family is also represented by the entire-leaved mountain avens (*Dryas integrifolia;* see, also, page 719).

they are eaten raw and uncleaned (see pages 680, 681, and 682).

As we proceeded south, dropping our Eskimos and their dogs at different villages, we encountered only one field of ice—in Melville Bay—which was easily negotiated.

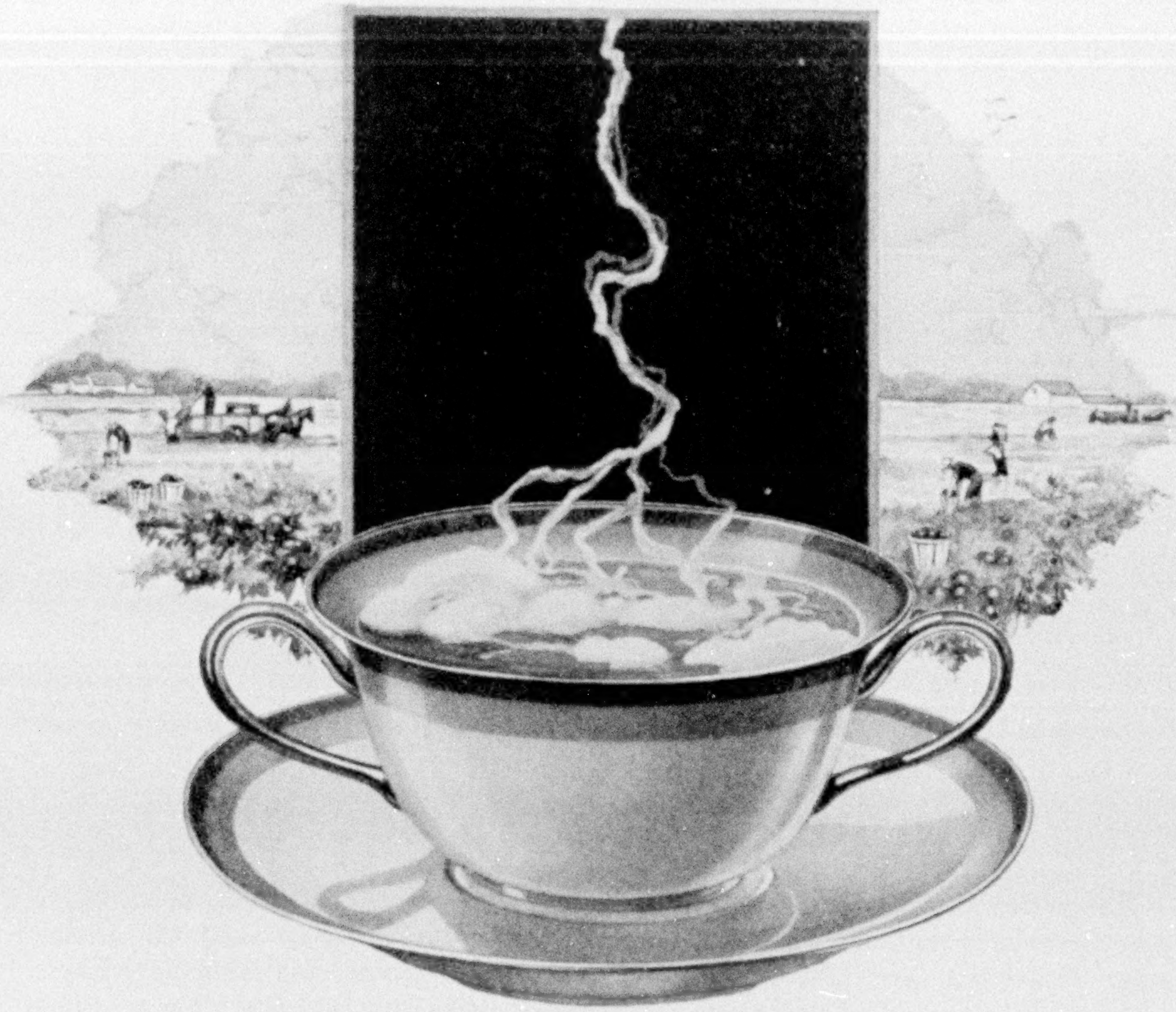
We coasted down the Greenland shore, calling at Disko, Egedesminde, Holstensborg, and Godthaab. At the last-named post we were royally entertained. Here the Eskimos gave us a remarkable exhibition of their mastery of their kayaks, rolling over in them, hanging head-down in the water, and even spinning over and over. These men well deserve the reputation of being the most expert boatmen in the world (see illustration, page 698).

We left Godthaab for Labrador with the Round-the-World Flyers. We came across in two and a half days; the planes flew the 560 miles from Ivigtut in about 7 hours.

Our trip from Labrador to Wiscasset, Maine, was without incident, with the exception of two gales of wind, one off Newfoundland, and the other off Halifax, Nova Scotia.

We reached Wiscasset on September 20, and were greeted by 6,000 people who had gathered from all New England to welcome the little *Bowdoin* back to her home port.

Tomato Soup that chefs try to equal



How much is expected of this savory, steaming cup of tomato soup!

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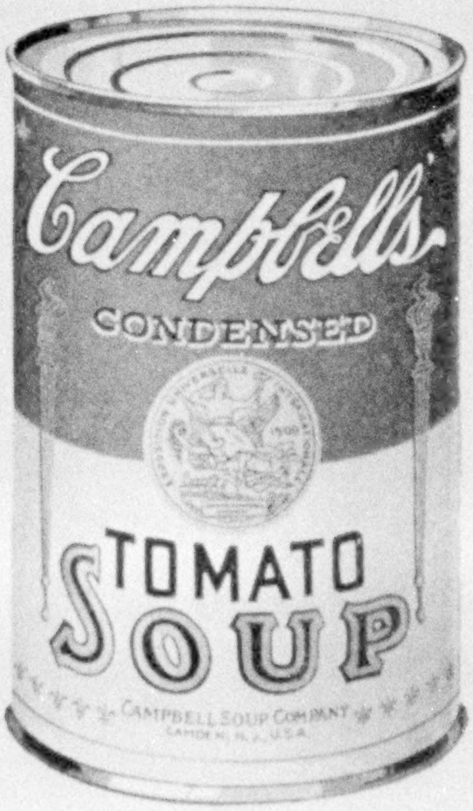

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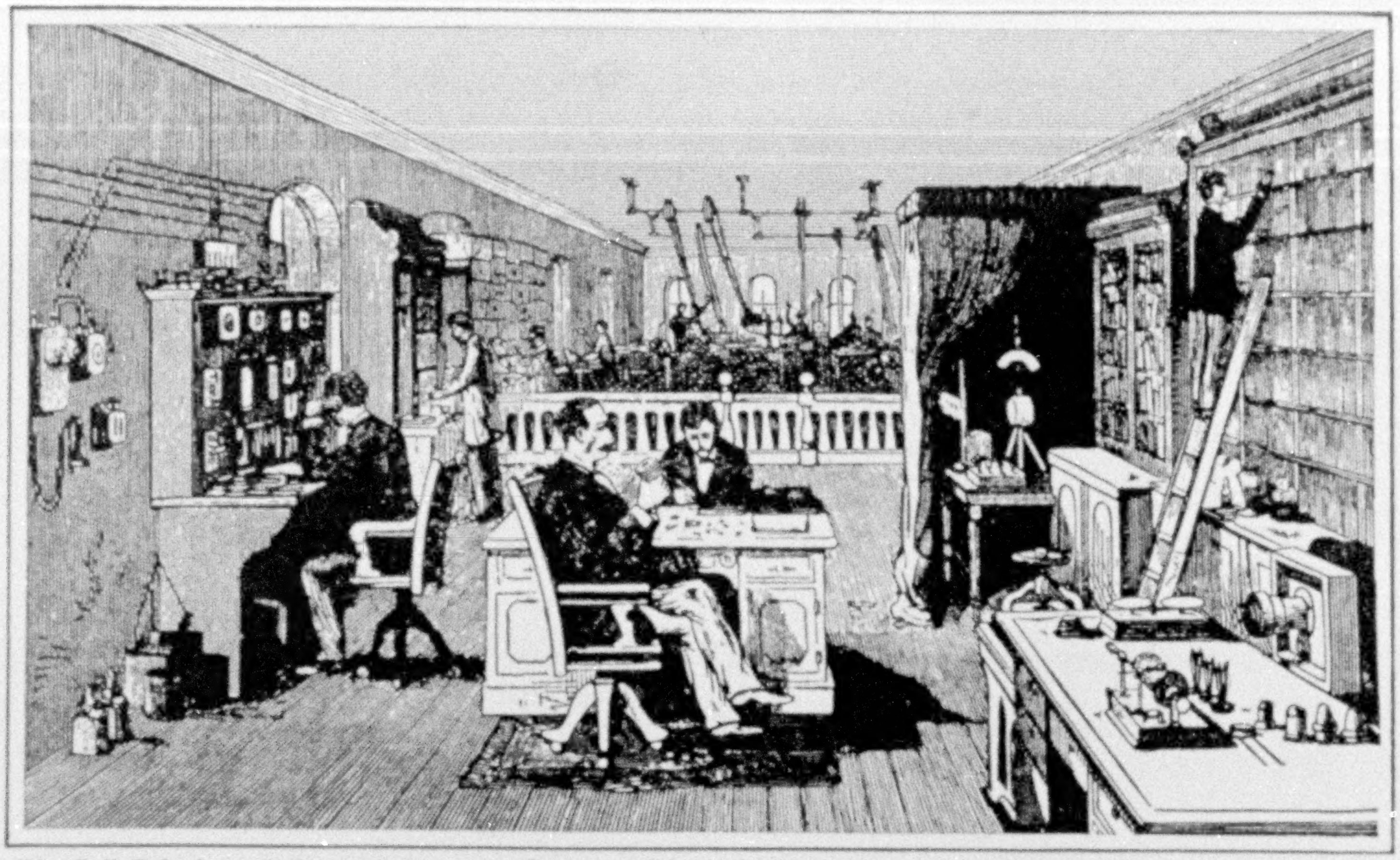

The Bell Telephone Laboratory in 1884. From an old wood engraving published in the "Scientific American"

Winning nature's secrets

Every day that passes records some new advance in the telephone art. Constant experiment and observation are winning new secrets of chemistry, of electricity and magnetism, and of matter. Nature's unseen quarry is yielding to the researches of the laboratory that exact scientific knowledge which is among the telephone engineer's most priceless resources. The workshop of the telephone engineer is a scientific laboratory. Here he studies and experiments with principles and laws of our physical environment and sets them to aid us in our daily lives.

Forty-nine years ago the telephone was born in a scientific laboratory—a very small laboratory, to be sure, as it numbered in its personnel none but Bell and his assistant. As the Bell System has grown that laboratory has grown, and as the laboratory has grown the telephone has grown in efficiency, in distance covered, in numbers, in perfection. Countless are the milestones marking progress in the telephone art that have come from the laboratory.

Today the laboratory numbers among its personnel 3000 employees, more than half of whom are skilled scientists and engineers. Headed by a vice-president of the American Telephone and Telegraph Company, it is known as the Bell Telephone Laboratories, Inc., and forms an indispensable department of the Bell System.

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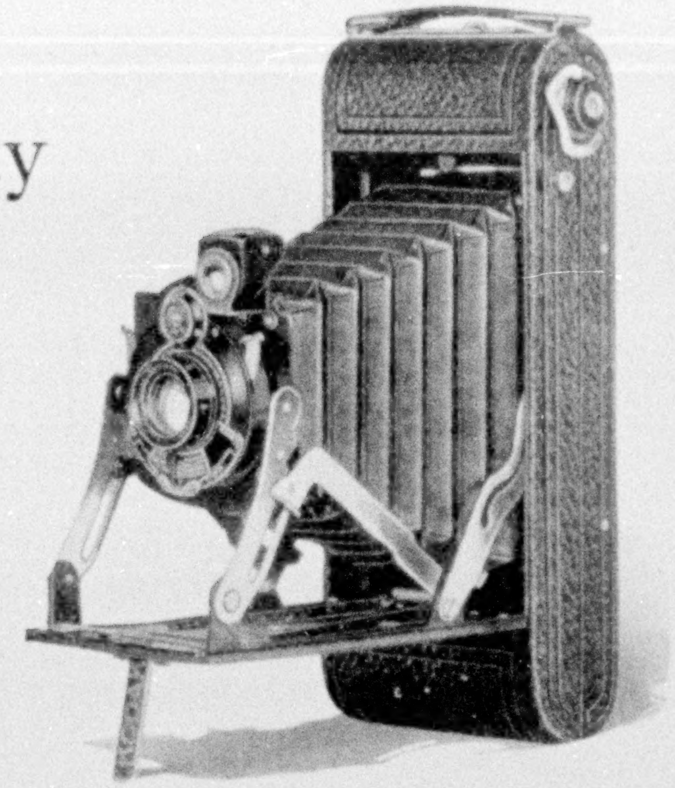

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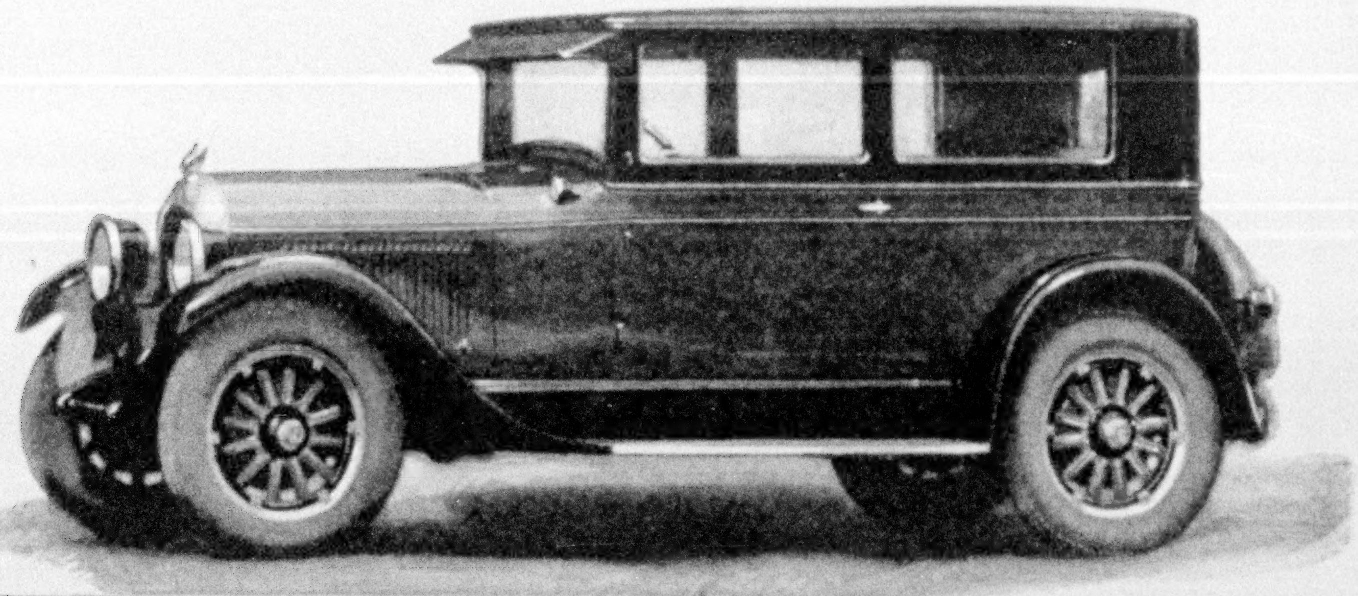

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The result is the long, low, sweeping lines—the pleasing general effect—which today mean Chrysler wherever they are seen.

But, over and above new and smart Coach design, the Chrysler Six chassis offers outstanding performance, the finest of materials, the same high engineering and manufacturing ideals which have always characterized the Chrysler —*on a basis of economy heretofore unknown in a fine motor car.*

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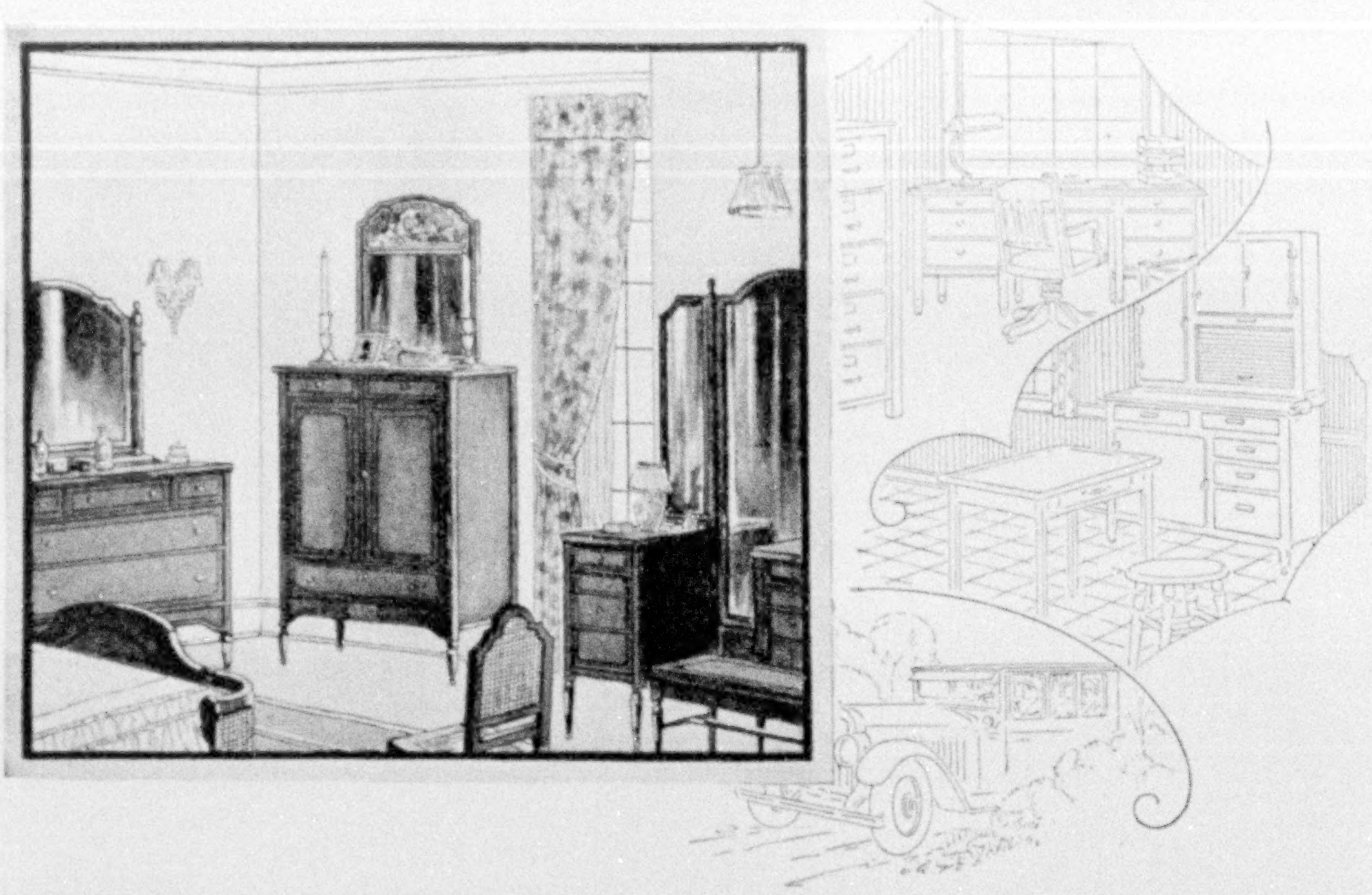

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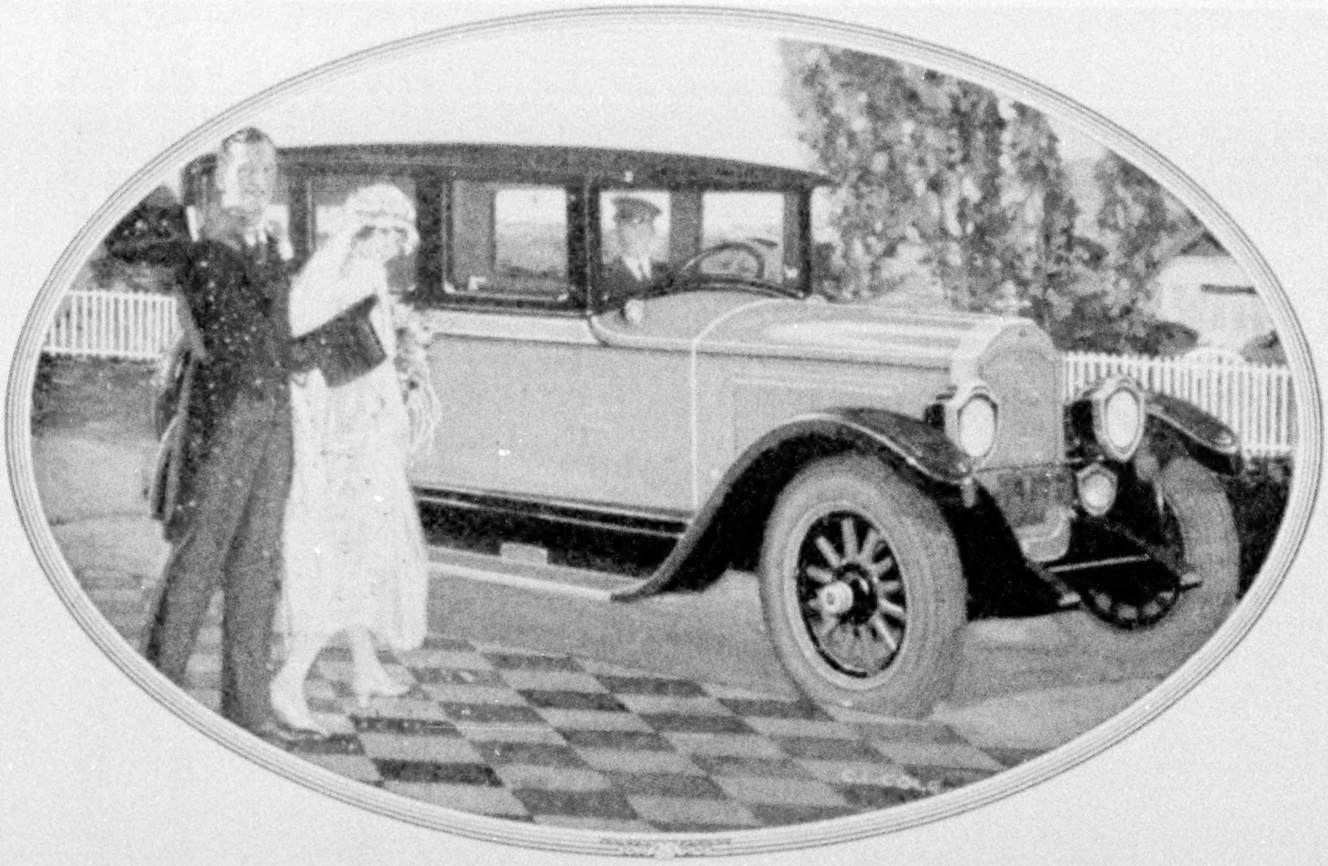
A Very Different Six for Those Who Want the Finest



To discerning motorists, all that need be said of the luxurious new Willys-Knight Six is the fact that *it* has the only type of *six-cylinder* automobile engine ever invented that actually and literally grows *quieter, smoother and more powerful* with use . . . That said, *nothing need be added!* . . . .

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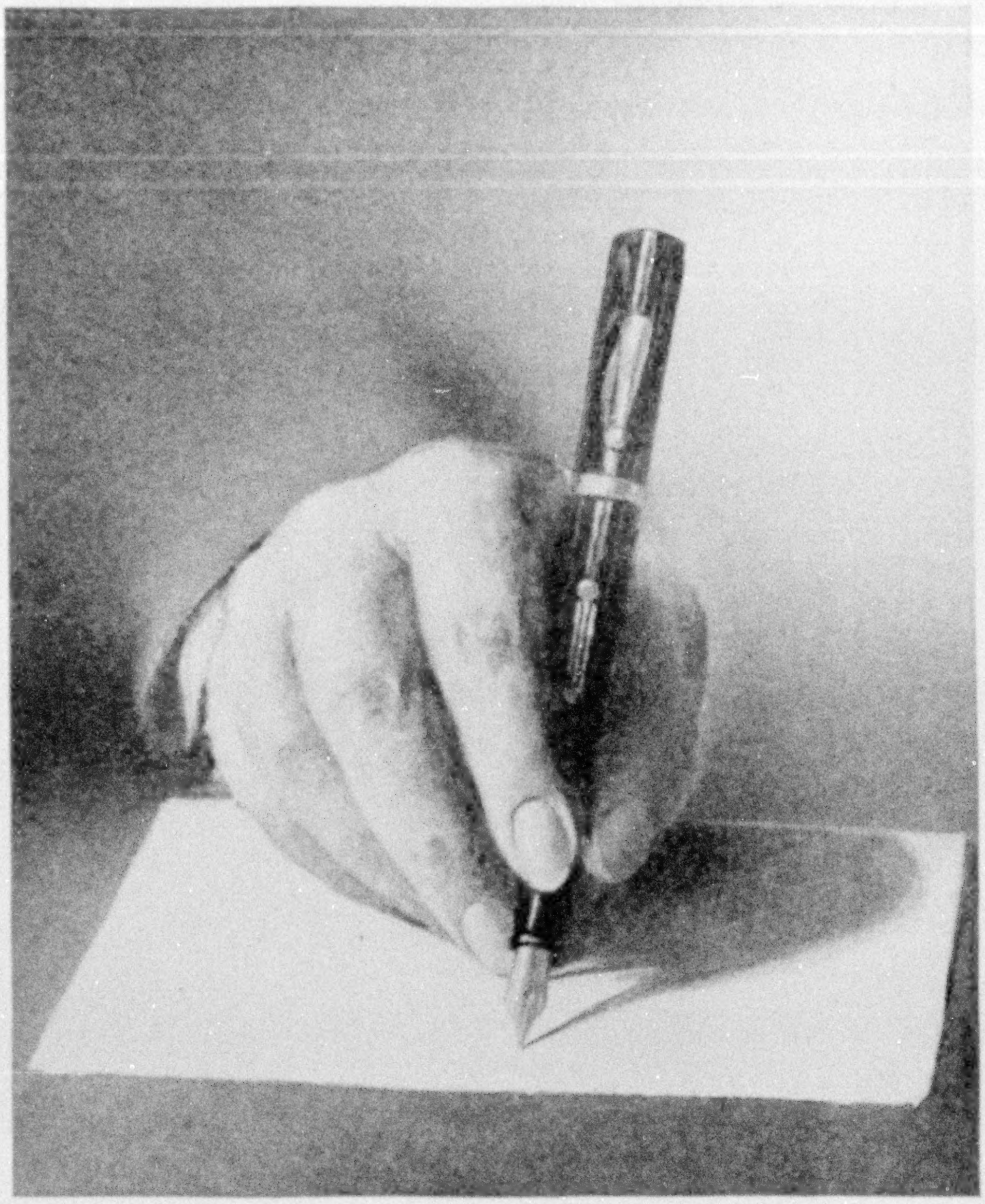
WILLYS-OVERLAND - FINE - MOTOR - CARS



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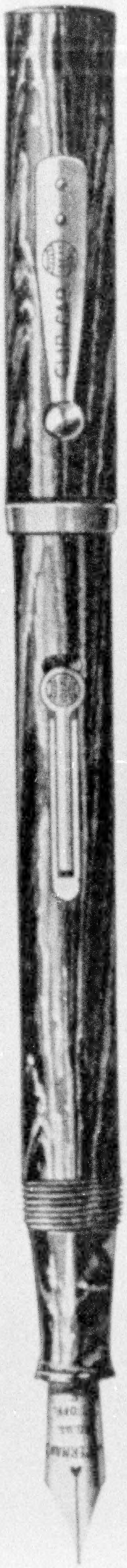

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Holder exact size.
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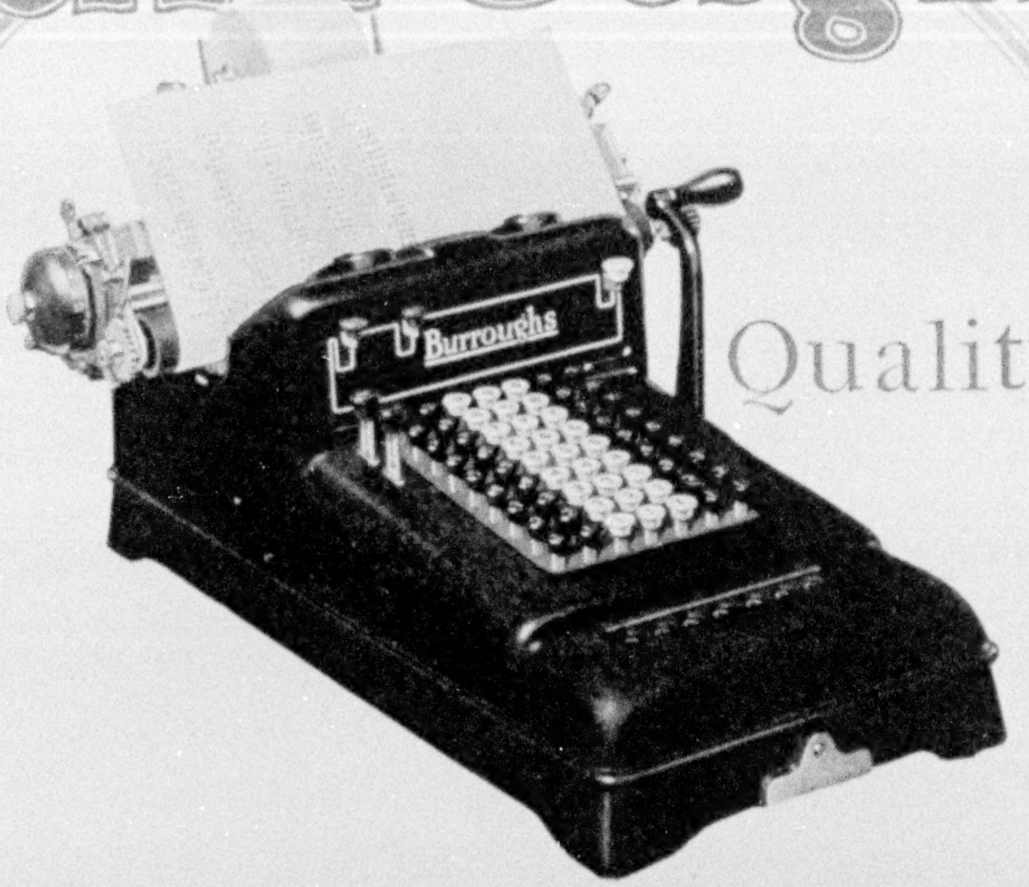

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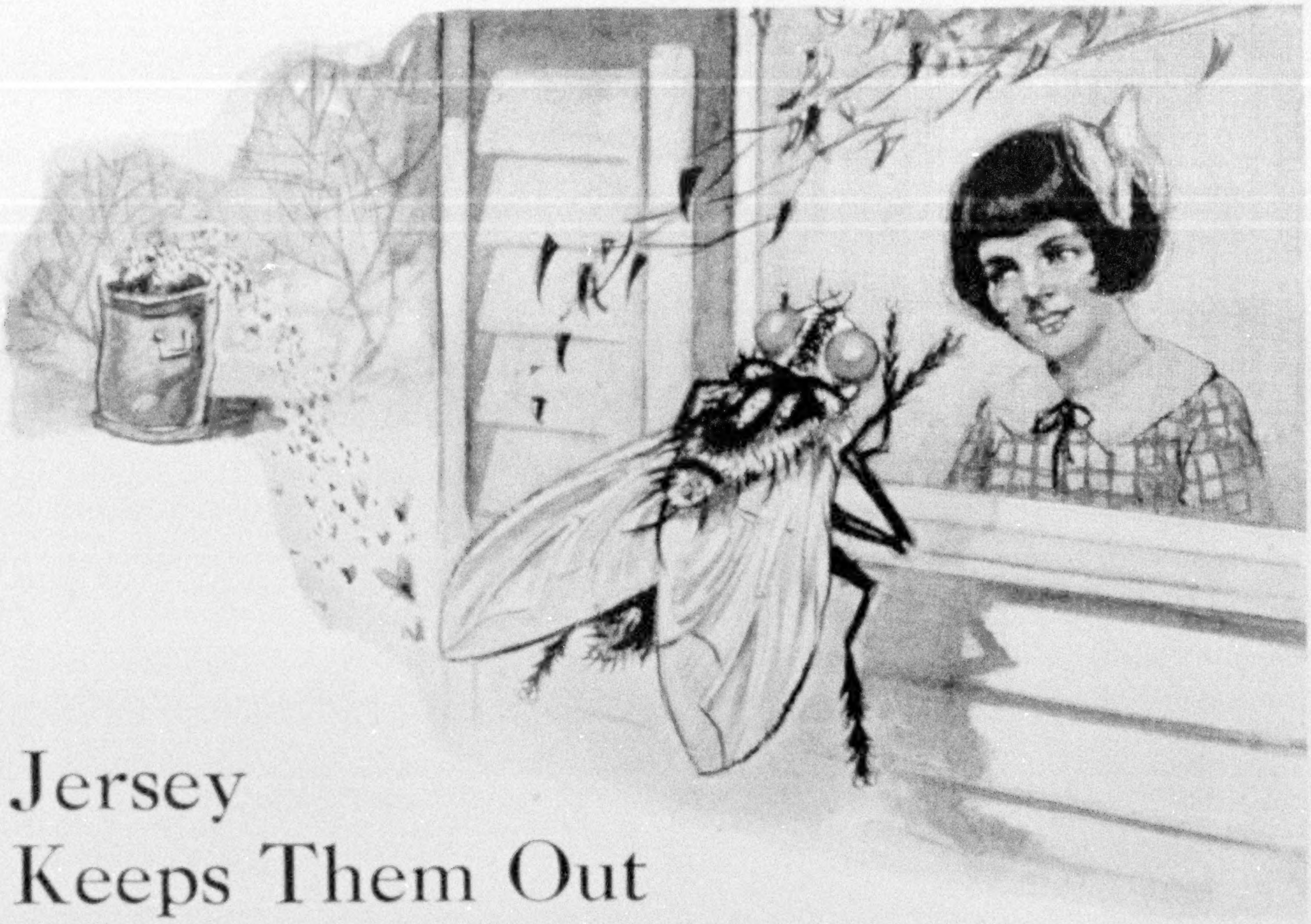

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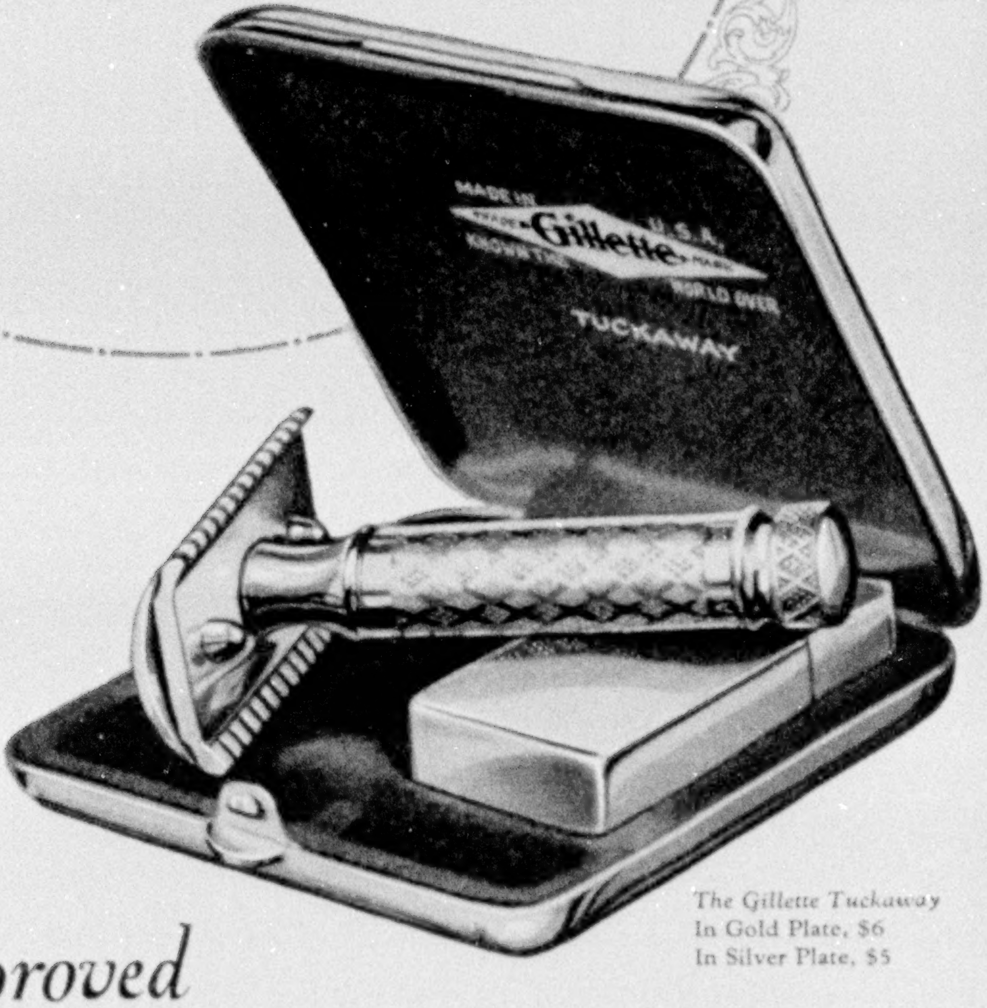
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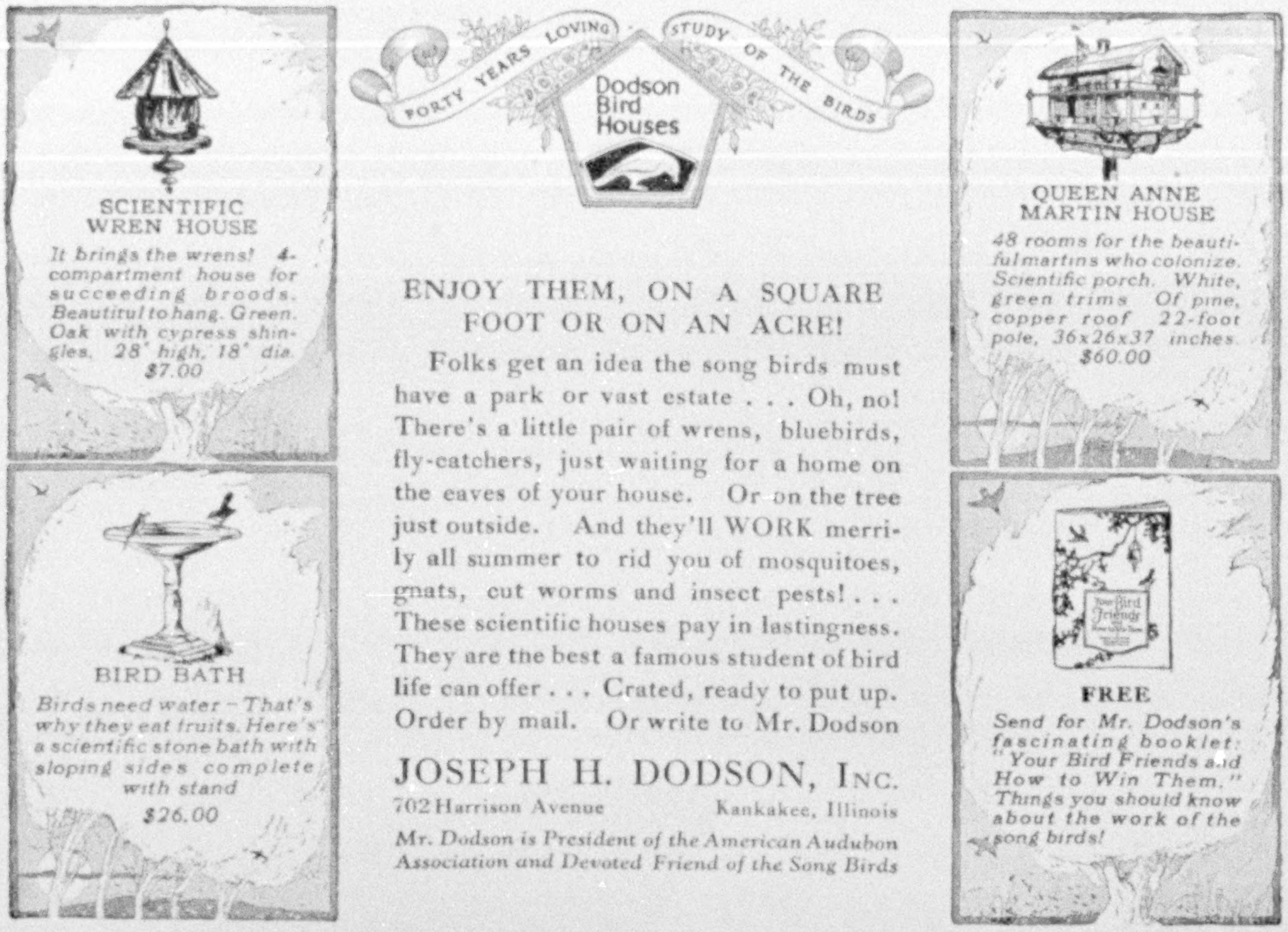

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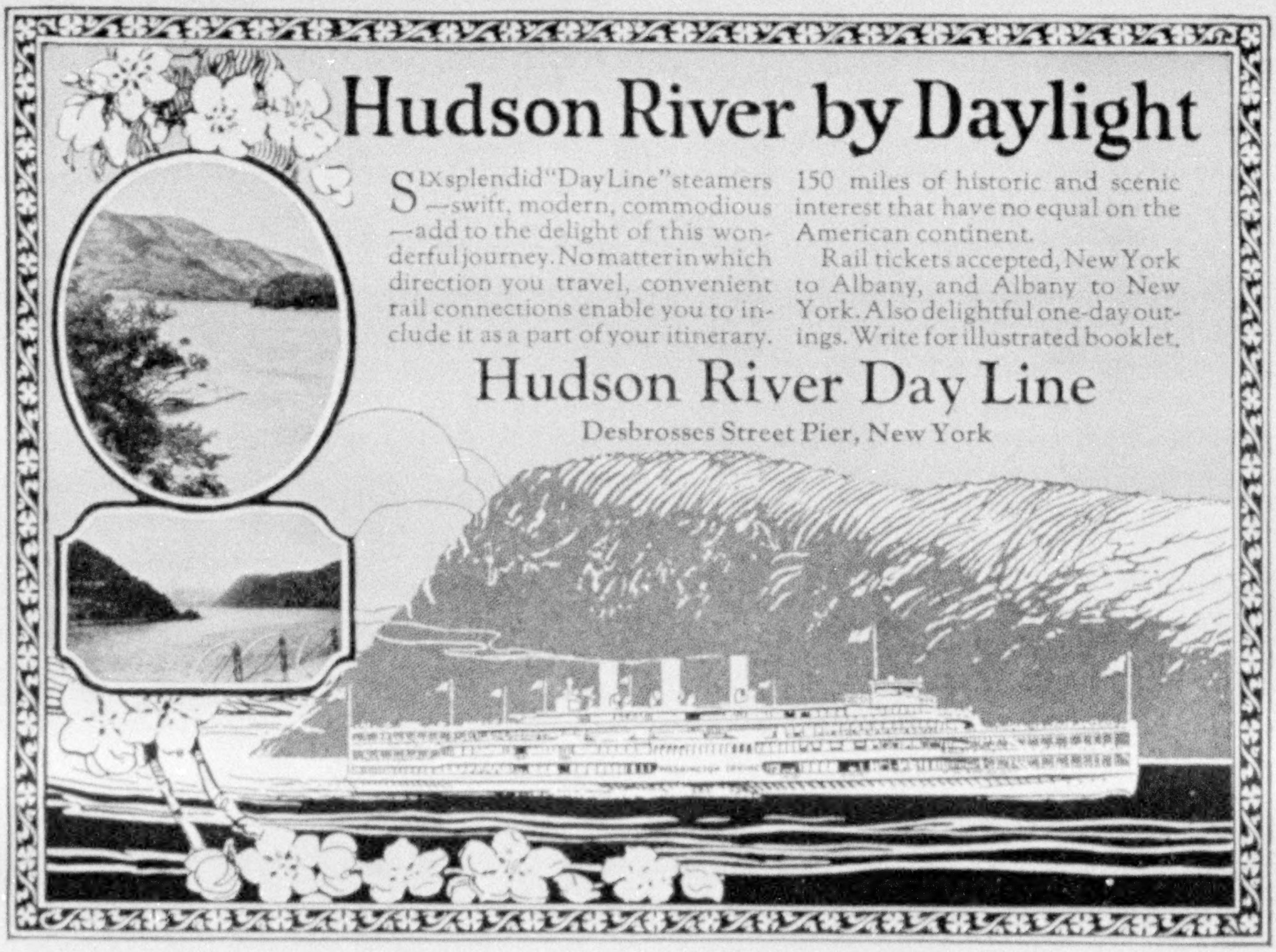

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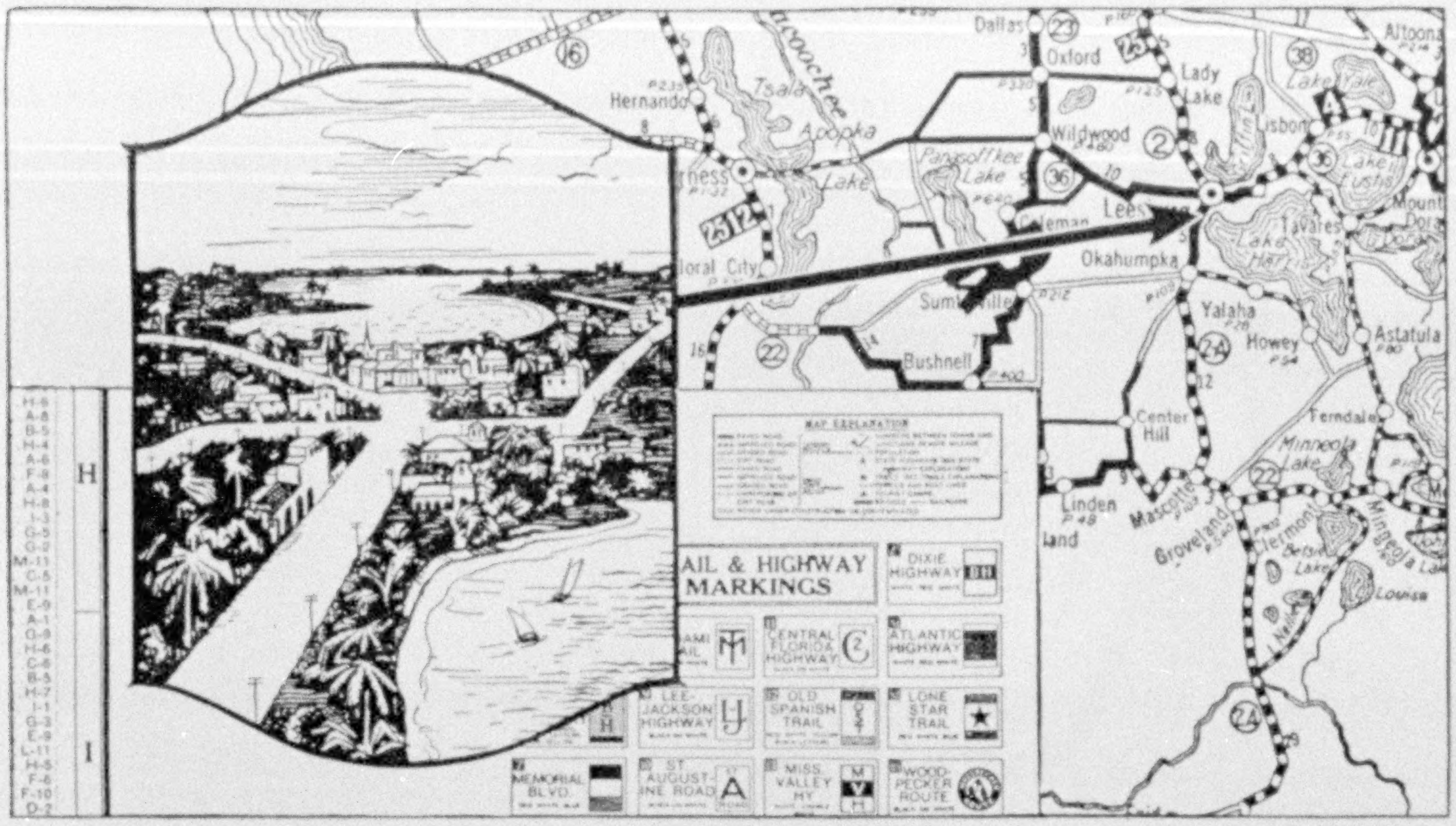
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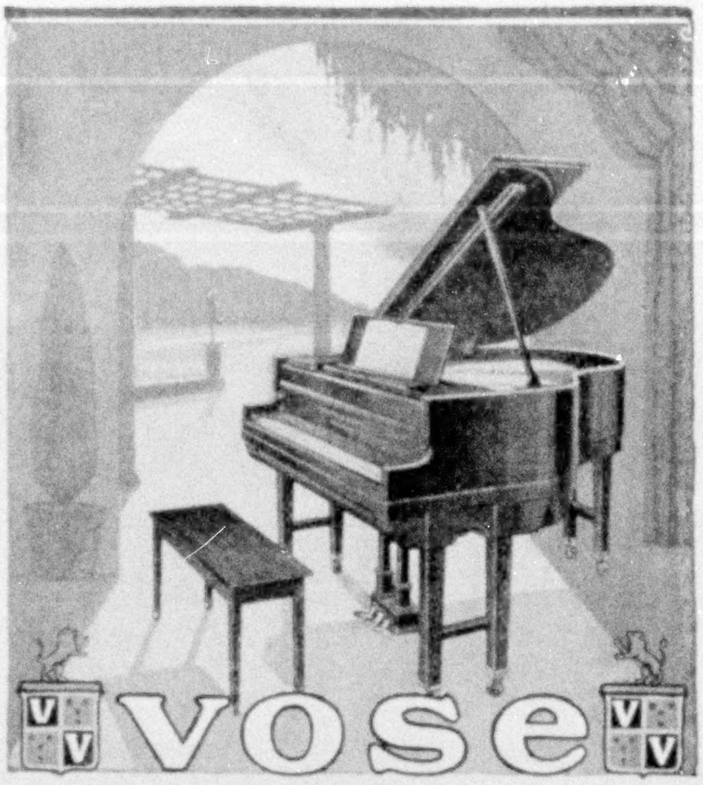

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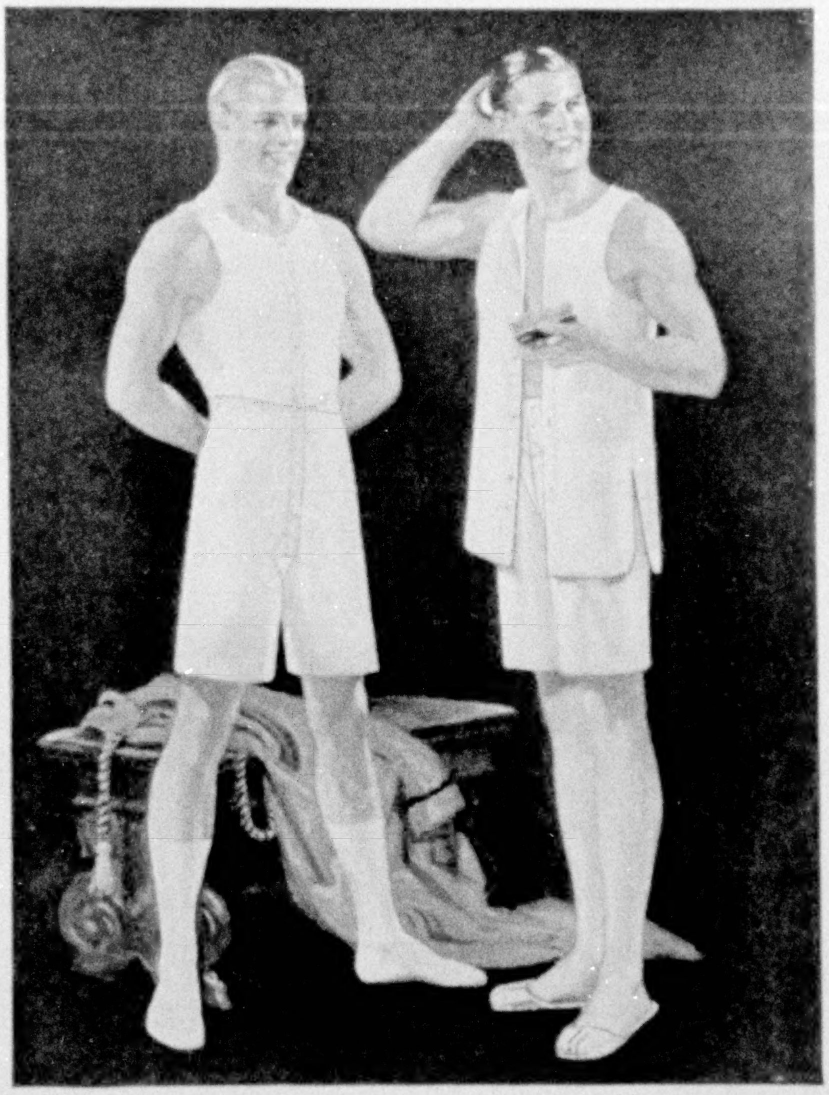

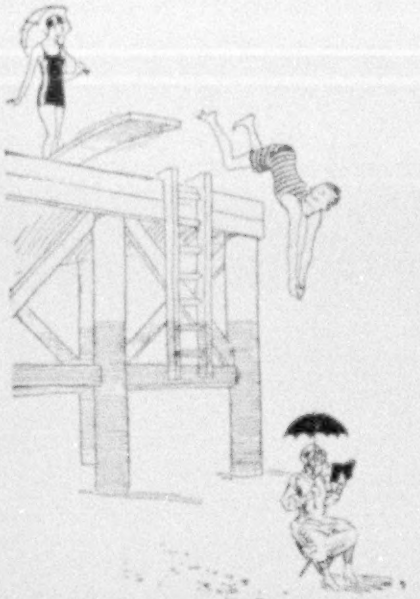

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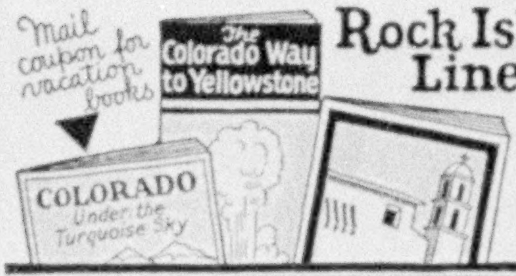
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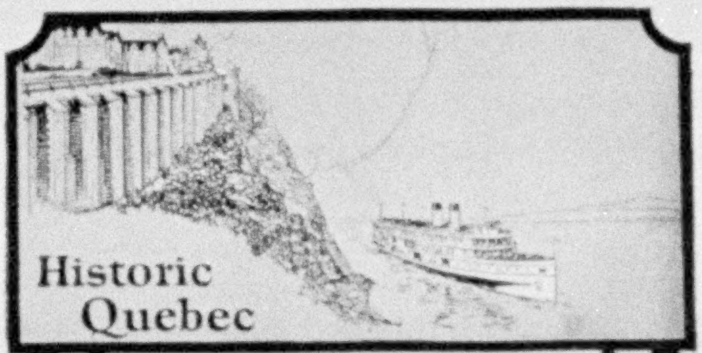

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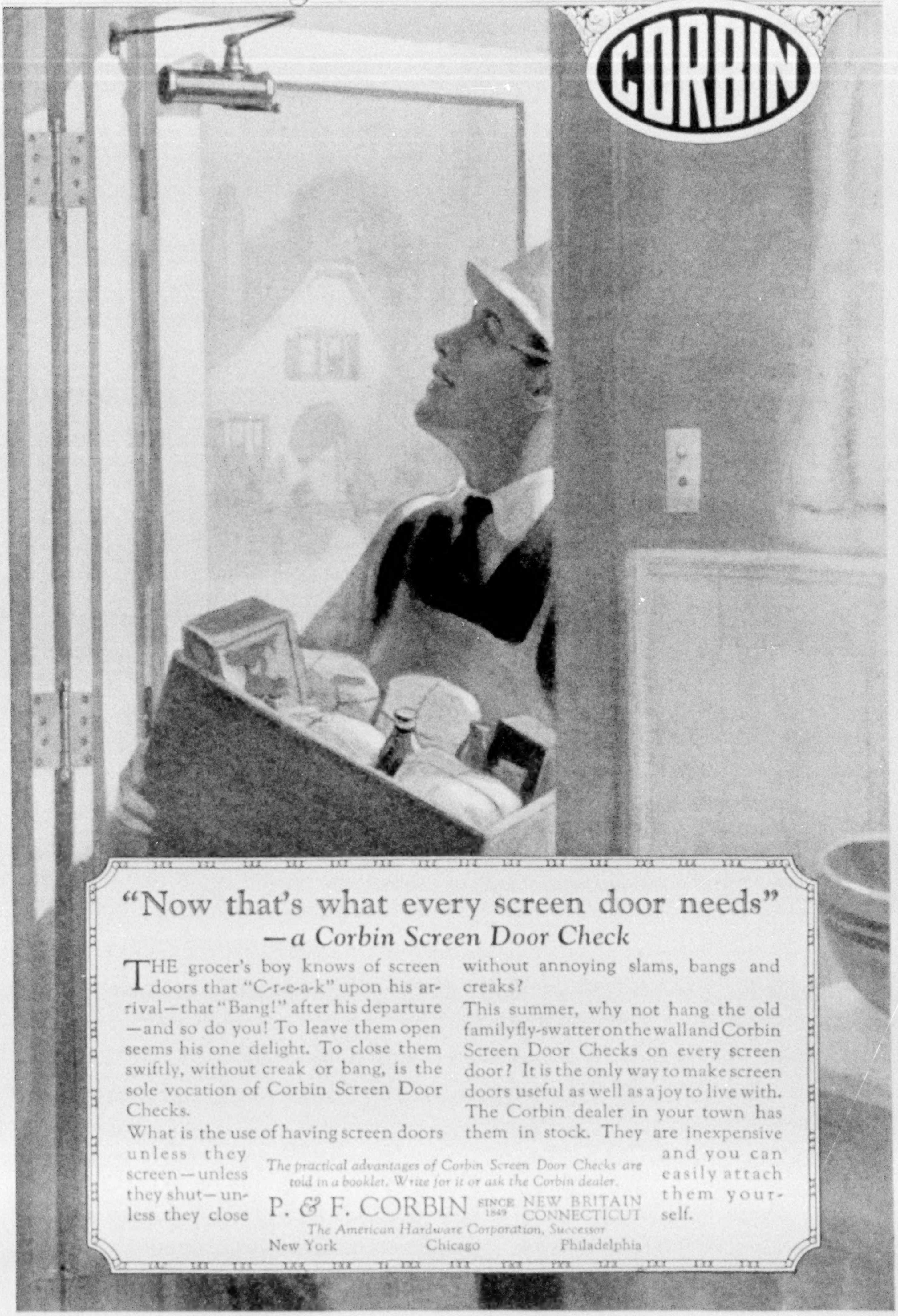

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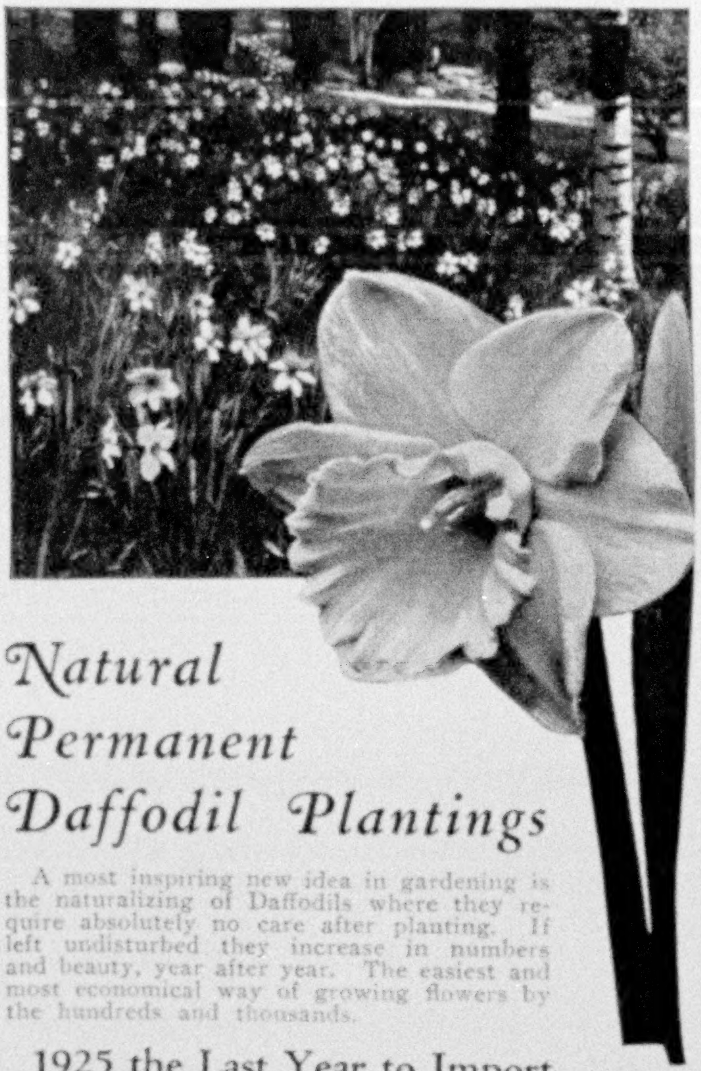

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A needless victim of Pyorrhea

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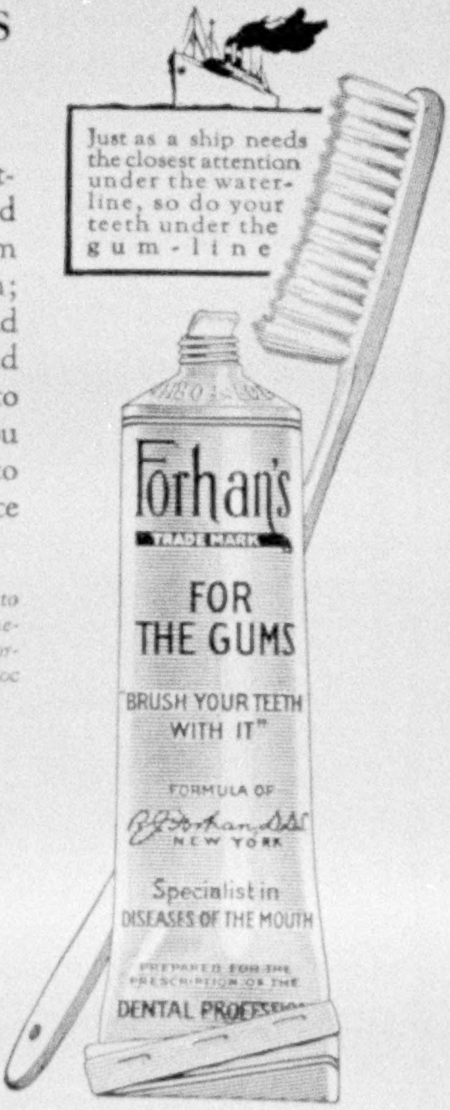

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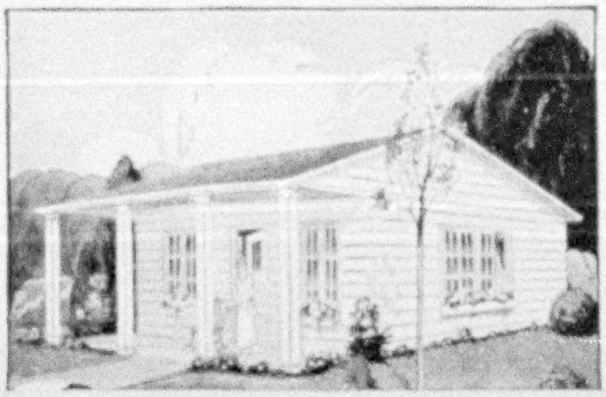

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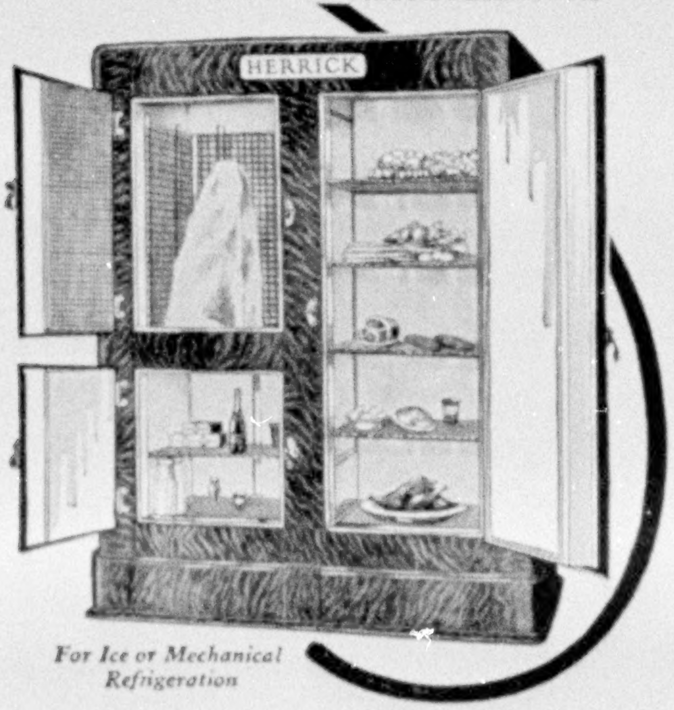

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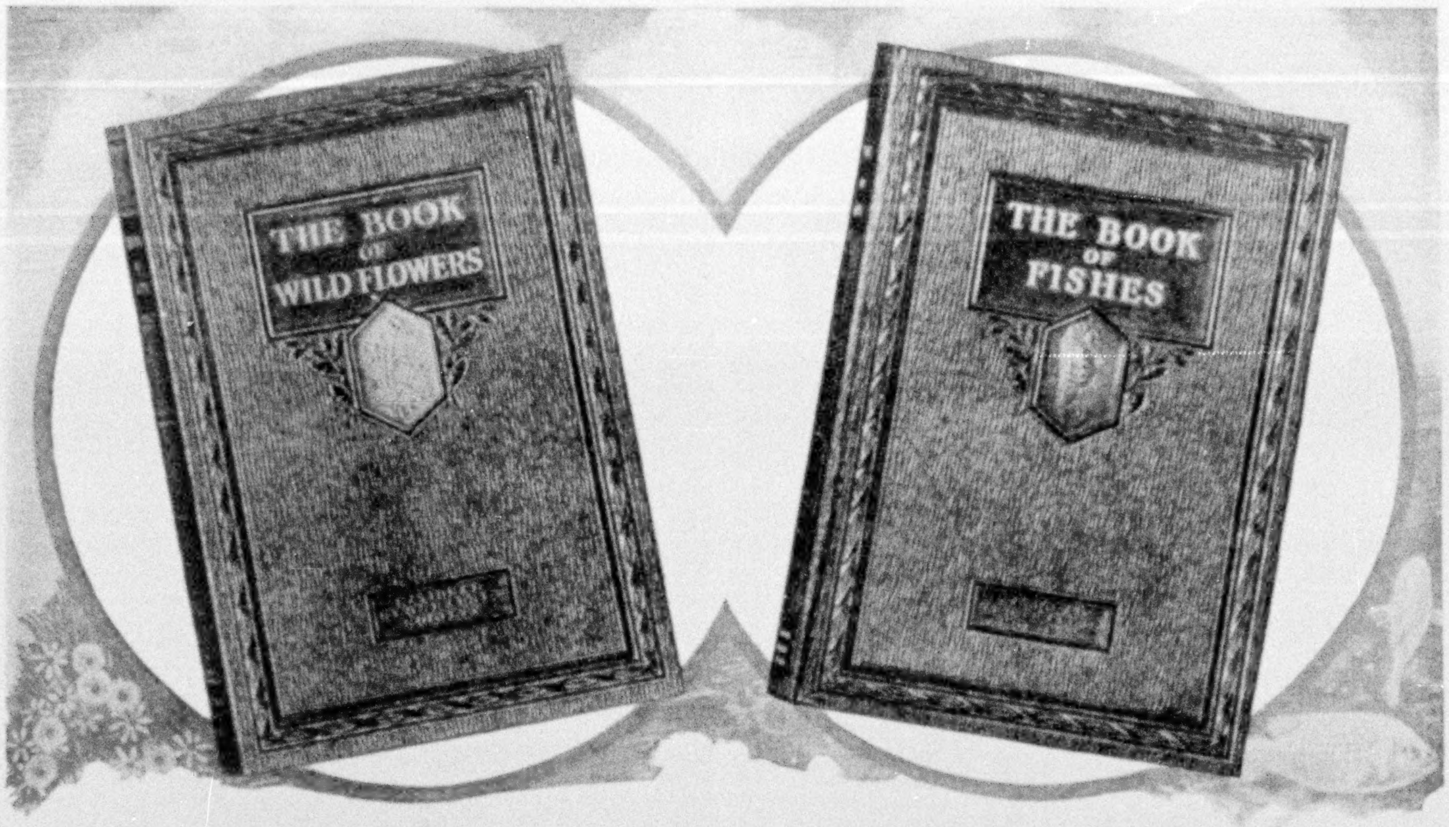
THE BOOK OF WILD FLOWERS
THE BOOK OF FISHES

The Who's Who of Water and Woods

Vacation necessities for country home, hotel, or camp—the best of introductions to nature for young and old

The BOOK OF WILD FLOWERS

By William Joseph Showalter
and Other Authorities

242 full-color portraits of flowers and plants by Mary E. Eaton, the world's leading painter of flowers; 8 full-page color microphotographs of grasses by E. J. Geske; many monotint engravings; 250 pages.

PREPARE for Summer with this "Who's Who of the Wild Flowers." It enables you to identify easily and name the 242 varieties of wild plants—including the State flowers—which pique our curiosity in yard, park, or countryside. Accompanying these remarkable color plates are flower "biographies" which tell, in a simple but fascinating narrative, the things we want to know about wild plants—how they grow and what purpose, as medicine or food, they serve. It is an unfading bouquet of the spring and summer flowers. Invaluable in the home—indispensable for schools.

The BOOK OF FISHES

Game Fishes, Food Fishes, Shellfish, and Curious Citizens of American Ocean Shores, Lakes, and Rivers

By John Oliver La Gorce and
Other Authorities

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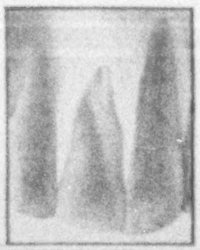

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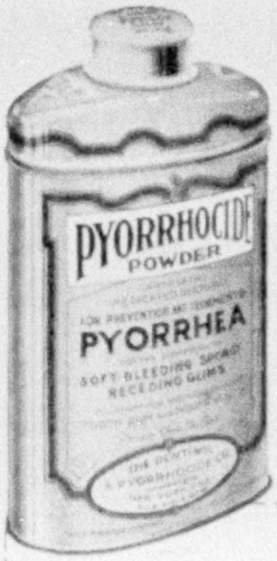
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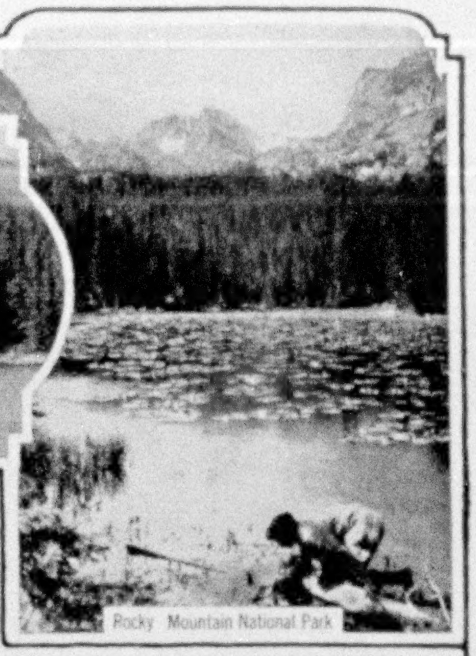
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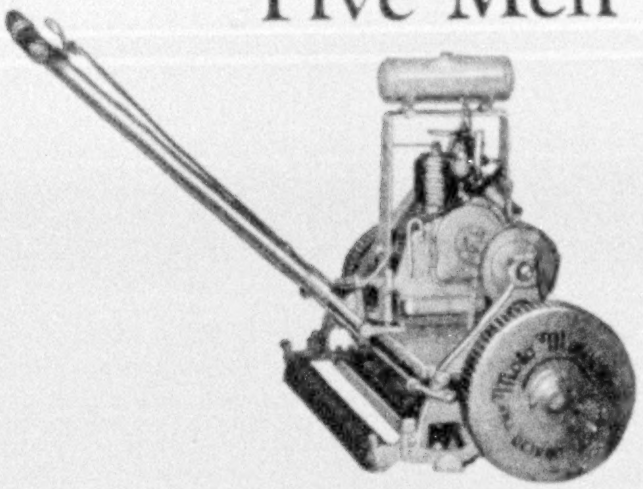

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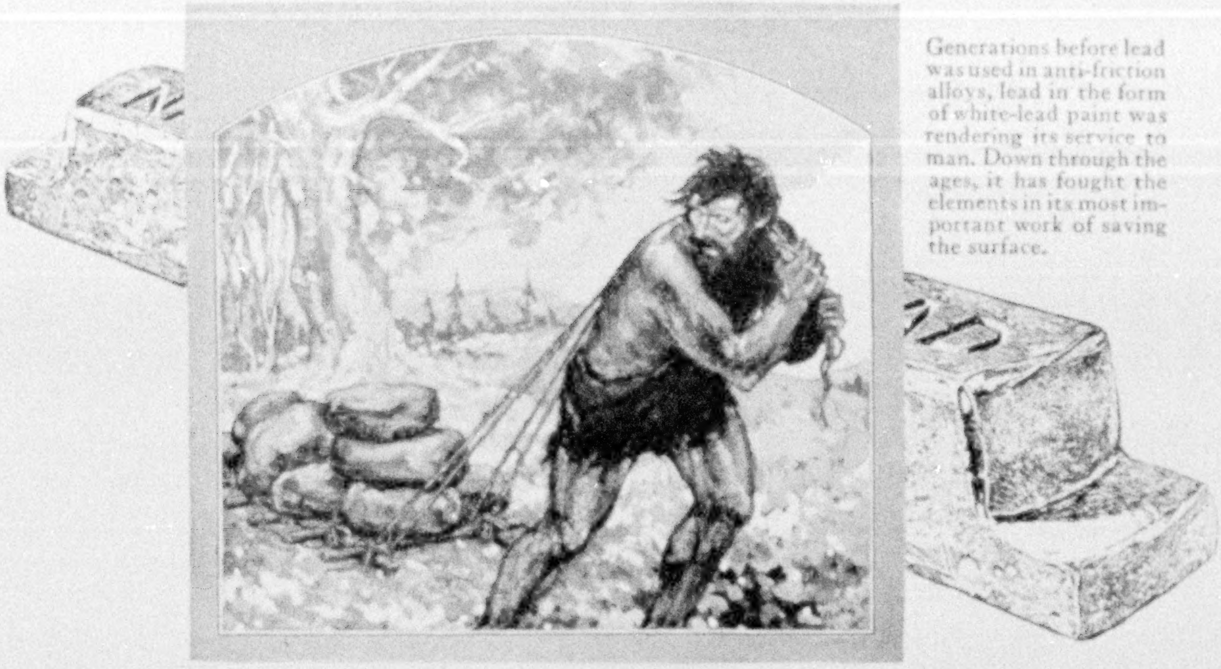

Generations before lead was used in anti-friction alloys, lead in the form of white-lead paint was rendering its service to man. Down through the ages, it has fought the elements in its most important work of saving the surface.

Friction How lead helps man control it

THERE'S a fight going on in this picture. The man is winning, but at a terrific expenditure of physical energy. Every time he tugs and pulls, friction does its best to hold back the runners of his improvised carrier. Friction was one of primitive man's worst enemies.

Today man has taught friction its place, has made it his friend. Not only does friction, by transmitting power, help to transport you from place to place; but by means of pulleys, belts, gears and friction clutches it enables you to turn your dynamos, print your newspapers, make your shoes, and do a thousand and one other things.

Yet even today, friction *in the wrong place* is man's enemy. The points at which friction is not desired are those where parts are supposed to slide or rotate. These are known as bearings. They must be a little tolerant because a shaft slightly out of true plays havoc in a high-speed machine.

How man fights friction

In 1839, Isaac B. Babbitt of Boston, Mass., invented a metal alloy which, when cast into bearings, would not only resist high pressures and the wear of rapidly rotating shafts, but would also conform to the play of a shaft without breaking.

From his first formula, many different types of bearing metals or babbitts have been developed to serve different purposes in industry.

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A complete line of babbitt metals is made under the well known Dutch Boy trade-mark. Among those most generally used are Dutch Boy Phoenix Metal, Dutch Boy Heavy Pressure Metal, Dutch Boy Genuine Babbitt Metal, and Dutch Boy Perfection Anti-Friction Metal. These bearing metals are expertly designed to perform every type of service.

In addition, National Lead Company produces under the Dutch Boy brand, red-lead, linseed oil, flatting oil and solder. This company also makes practically every form of lead product used by man today.

Write to our nearest branch for information on babbitt metals, or for information about any other uses of lead in which you may be interested.

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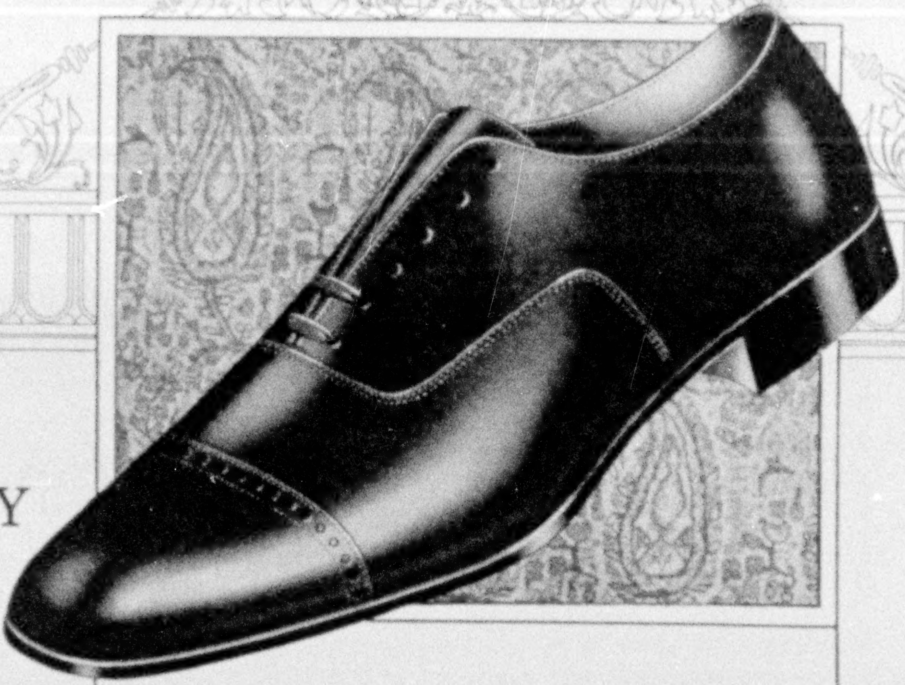

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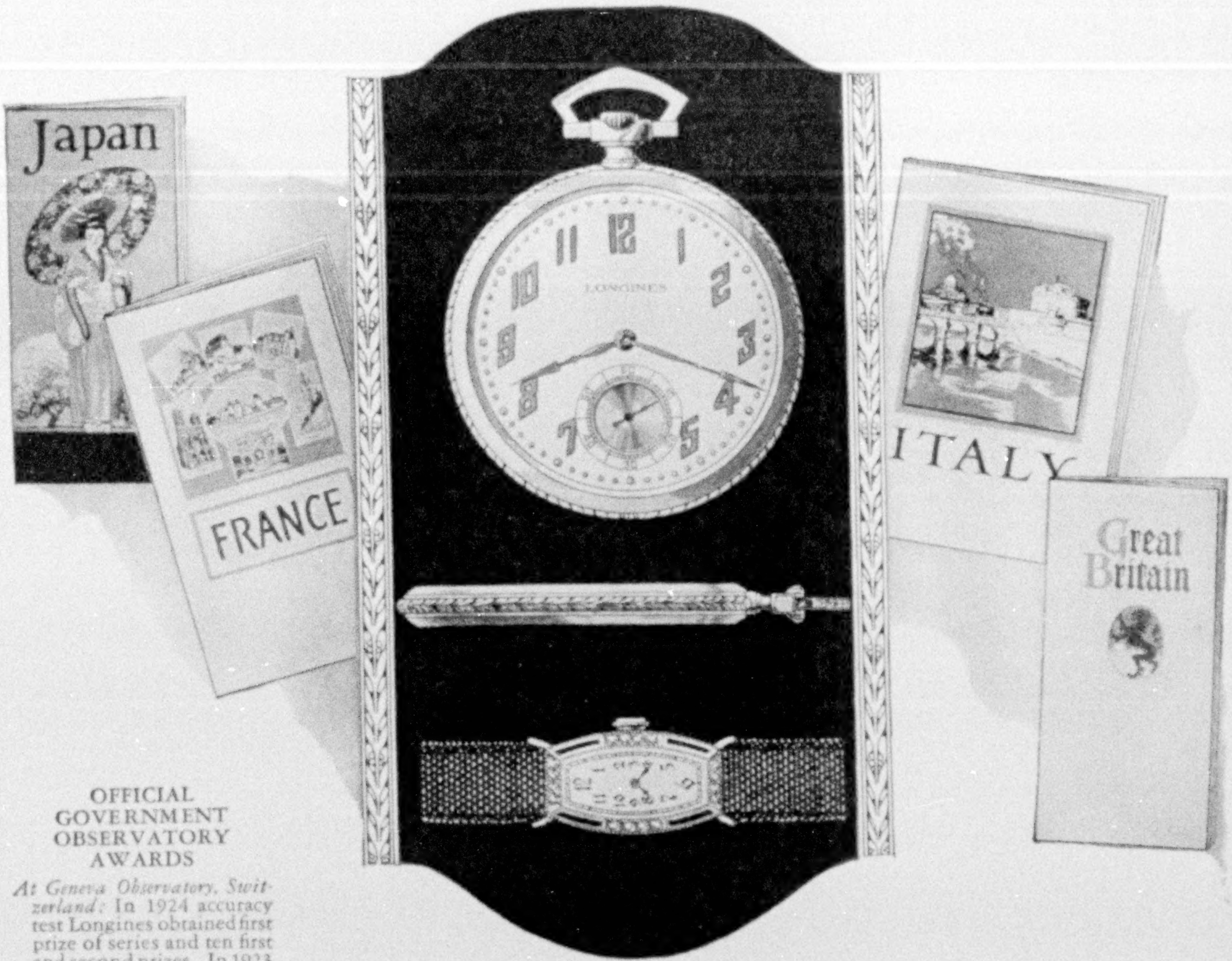

OFFICIAL GOVERNMENT OBSERVATORY AWARDS

At Geneva Observatory, Switzerland: In 1924 accuracy test Longines obtained first prize of series and ten first and second prizes. In 1923 Longines were awarded one first and ten additional first and second prizes.

At Neuchatel Observatory, Switzerland: Since 1905, Longines Watches have received 365 awards in International accuracy contests. During 1924 Longines received in accuracy contests seventeen first prizes.

At Kew Teddington Observatory, England: Since 1910 Longines Watches have received 132 accuracy awards, won in International Contests. During 1918 accuracy test Longines made the World's record for best performance. Since 1919 all Longines Watches submitted passed with mention "especially good."

East of Suez - or West

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Leading jewelers *wear* them and recommend them They will gladly show you the latest Longines models, priced from $35 up to $1000. And, in case of accident, repairs are prompt,—jewelers carry in stock a supply of interchangeable parts. Write to us for a booklet of styles and for names of jewelers nearest you.

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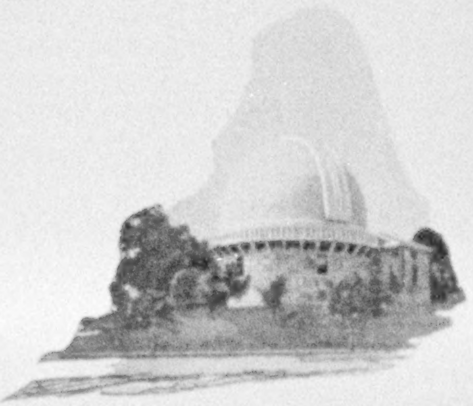

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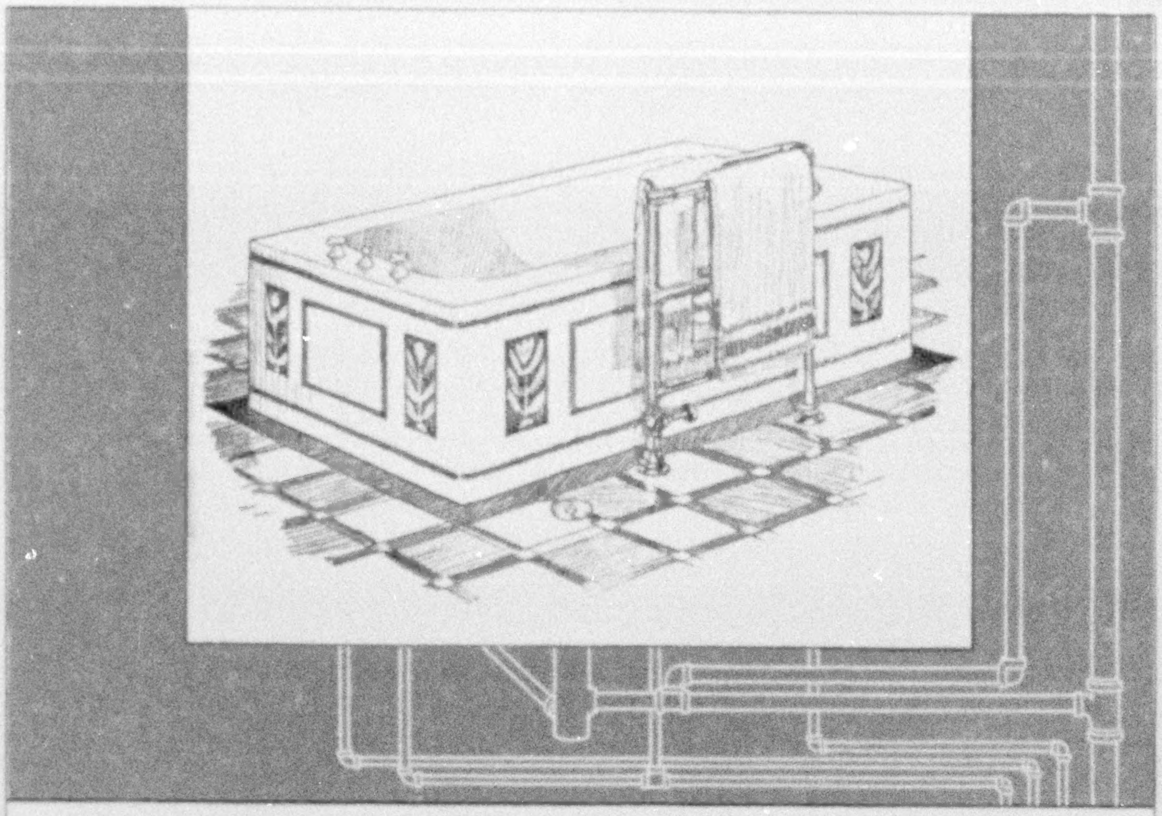

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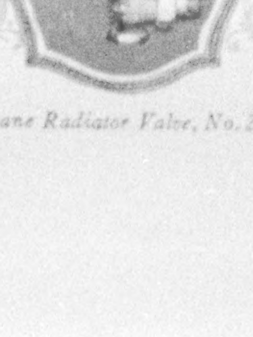

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